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The Naval Aviation Safety Review

V.31 #3

U.S. Navy

# approach



# The Safety Center at a Glance


**Part IV: Mishap Investigation Division** The aircraft mishap investigators are continually striving for obsolescence. When the mishap rate eventually gets so low there is not enough work to do, they will happily fold up shop and disappear. In the interim, they are available to assist aircraft mishap boards (AMBs) in sorting out the wheat from the chaff in the investigations of the causal factors of aircraft mishaps. They provide expertise to AMB members to aid in salvage, aircraft layout and engineering investigations. They only participate where there is recoverable wreckage and physically accompany suspected failed parts to the Naval Air Rework Facilities where they provide the cognizant engineer with pertinent facts concerning the circumstances surrounding the mishap.

The division is staffed with seven investigators; one civilian, one Marine major and five Navy commanders/lieutenant commanders. They operate on a ladder system for mishap investigations and each investigator averages one investigation every 50 days. An aircraft mishap investigation takes about one week for salvage, one week for wreckage layout and one to two weeks for engineering investigation (one week each for airframe and engine components). When not on the road, personnel attend refresher training and provide training lectures and presentations for various command's safety stand-downs. There is a wealth of experience in the office. One investigator has investigated over 35 mishaps and another is on his second tour as an investigator.

While the Aviation Safety Officer (ASO) Course at Naval Postgraduate School in Monterey, California teaches mishap investigation, it does not prepare the AMB members to remove the emotion from an investigation. Sir Arthur Conan Doyle wrote; "It is unwise, my dear Watson, to speculate in advance of the facts; " Holmes admonished, "Invariably, it biases the judgment." Mishap investigators arrive with no bias, no axe to grind and no preconceived ideas. If you find yourself in the position of being an AMB member and need assistance, we're only a phone call away. The office is manned 0730-1630 EST/EDST Monday-Friday at Autovon 564-3321. After hours we can be reached on the crash reporting phone at (804) 444-3321/2929 or via the NAVSAFECEN duty officer at A/V 564-3520.

# inside approach

Vol. 31 No. 3

E-2C Hawkeye of VAW-120 conducts FCLP (Fleet Carrier Landing Practice) at NALF Fentress. Photo by Peter Mersky

## FEATURES



## DEPARTMENTS







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# "Your Signal


. . . As we leveled off and proceeded on our way, the gravity of the situation began to sink in. We were headed to a strange field at night for a single-engine landing on carrier-pressure tires and, worst of all, I forgot my wallet! . . .

# l Is Divert . . ."

By Lcdr. C.S. Sayers II

The article is fiction, although it is based on two recent F-14 incidents and describes a situation which might occur at any time. — Ed.

FOLLOWING nine relaxing days in port, it was now time to return to the reality of carrier flight operations. We were five months into a seven-month deployment and my "FNG" pilot could now be considered a "polished nugget." Crewed since work-ups, Geno and I were confident that we could handle just about any tactical or emergency situation. Little did I know that on this first day back at sea we would have an opportunity.

Our second event involved a twilight launch for a night infrared (IR) TARPS mission. The rushed, yet thorough, preflight planning included several suitable diverts which dotted the southern coast of France. The ship's convenient "MODLOC" and favorable weather promised an uncomplicated divert, should the occasion arise.

The CVIC brief provided no surprises, allowing us ample time to cover the in-house items with the crew of our escort aircraft. A thorough discussion of the operating area, the emergency of the day and divert considerations concluded the brief.

The preflight, start and taxi were completely routine and uneventful. As we were taken to the catapult, the sun was peeking from behind some clouds along the horizon. I remember thinking how nice it would have been to be recovering now instead of launching. At that point we spread our wings and completed the takeoff checklist.

Tension, controls, afterburner and a salute sent us racing down the catapult track. I paused momentarily before calling "airborne," to ensure all was OK. With the gear and flaps up and a steady rate of climb, I called "passing two point five." It was now that I noticed Geno's unusual activity in the front cockpit. Our uneventful flight abruptly changed as Geno informed me that the right throttle would not move aft of the military/afterburner detent. Continuing our climb, we requested a squadron representative to help sort options.

Orbiting in a clear area, our wingman joined to look us over. Although twilight, he confirmed that at least externally, we were clean.

The radio cracked with the voice of the squadron rep. We explained our problem. After kicking around ideas on throttle modes, throttle friction and aircraft "g" to free the jam, Geno noticed an object protruding from the right side of the quadrant along the throttletrack. The object appeared to be a "can" of some sort and would not budge!

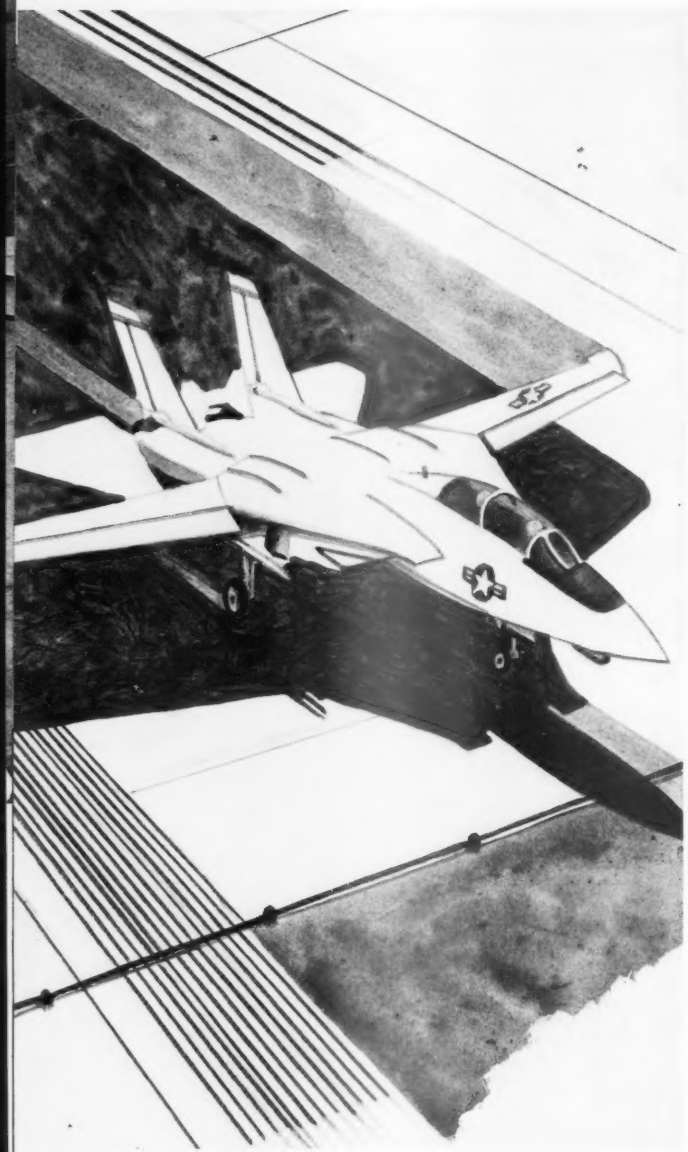
The NATOPS PCL does not cover this particular situation; however, as Geno slow-flighted the aircraft, it became obvious that we would be unable to get slow enough for a normal recovery and would be using the single-engine section extensively before the flight ended. With darkness rapidly approaching, the option of a single-engine "CV" recovery faded with the light.

The squadron representative asked us how much gas we had on board. We replied, "roughly 13,000 pounds." Expecting the signal to divert, we began reviewing the briefed field which was less than 50 miles away. However, to our surprise, the rep informed us that our signal was divert to NAS Sigonella! Some quick calculations and an update of our inertial navigation system confirmed our steer at 120/450 nm. Even with one engine at military and one at idle, we could make it . . . but why Sigonella? It was then that I remembered the air wing had a small Sigonella detachment and the ship's PIM was in that direction.

Geno turned the jet toward the divert as I scrambled to update the destination steering. We decided to keep both engines operating until arriving overhead Sigonella and then securing the right engine, via the fuel shutoff handle, prior to taking a field arrestment.

A modified "bingo" profile required us to level off at 27,000 feet MSL to sustain 280 KIAS, with one engine at military and one at idle. The airspeed was significant since we would not have speed brakes available due to the right throttle position. Additionally, 280 KIAS is maximum airspeed for landing gear extension, and we intended to lower them to control our airspeed during the descent. As we leveled off and proceeded on our way, the gravity of the situation began to sink in. We were headed to a strange field at night for a single-engine landing on carrier-pressure tires and, worst of all, *I forgot my wallet*! In the meantime we broke out the PCL and reviewed the appropriate single-engine procedures.

It was now quite dark and I was somewhat frustrated due to our inability to raise *Roma* control. We were squawking emergency and navigating via INS while radar mapping toward our destination. After 20 minutes of flying time, *Roma* control responded and was very helpful in alerting NAS Sigonella about our problem and landing requirements. I was beginning to get a warm and fuzzy feeling about our situation when Geno informed me of a significant fuel split



that was developing. The engine at military was rapidly depleting its fuel while the engine at idle was relatively full. It was not possible to balance the fuel via the fuel transfer switch, we surmised, without advancing the left engine to military to match the output pressure of the right fuel pump. Discussing this idiosyncrasy, we resolved that if the automatic fuel balancing features did not function, the right engine would be allowed to flame out, which is what we intended eventually anyway.

We were now nearing the island of Sicily and beginning preparations for our descent. The fuel split took care of itself as the automatic features kept the right side from going to zero. At 27,000 feet our indicated airspeed was 280 KIAS/.58 IMN so we felt comfortable lowering the landing gear, thereby increasing our drag and helping us control our airspeed in the descent. The landing gear had no sooner become down and locked when Geno reported "RAMP" lights on both engines. I thought to myself, "What next!" After completing the "BOLDFACE" procedures, we reviewed the circumstances surrounding the illumination of the lights. Geno remembered that with the landing gear down above .5 IMN, the No. 1 and No. 2 RAMPS would be programmed out of the stow locks, resulting in the RAMP lights. As we descended in altitude and our airspeed decreased below .5, the RAMP lights went out.

Over NAS Sigonella and level at 10,000 feet, we secured the right engine to give us an opportunity to slow-flight the aircraft and dump fuel as required. We reviewed the field geography and appropriate single-engine and hydraulic failure NATOPS procedures before continuing our descent. Confident that all of the blocks had been checked, we lowered the flaps and continued our descent. It was obvious from Geno's comments that the aircraft did not respond to power changes as he expected. Our fuel weight placed us at roughly 49,500 pounds and we decided that our 12-unit approach would be flown at no less than 150 KIAS until final. Once on final we could fly 14 units until touchdown.

As we neared the final approach fix, Geno commented that it took momentary selection of Zone 2 afterburner to sustain our airspeed and, more importantly, control our rate of descent.

The field was now visible, particularly the crash vehicles, and we continued for a planned field arrestment. Geno flew one of his better passes, and we concluded the flight with an OK, in my opinion!

In the morning our maintenance folks arrived and found that, indeed, a metal cam that usually moves freely to prevent inadvertent selection of afterburner had become stuck. In no time the subject cam was repaired and we were on our way.

We felt pretty good about our handling of the situation; however, we both realize that bad weather, NORDO or improper procedures could have changed the outcome dramatically. ◄

Lcdr. Sayers is an F-14 RIO with 2,000 hours of flight time, currently assigned to Fighter Squadron 102.

# Decision to Eject

By Lcdr. S.E. Collins

I was only five or six hops away from completing the RAG and being assigned to my first fleet squadron. The day began routinely with two lectures and one trainer in the morning. However, the afternoon was different. I was scheduled for a back-seat ride in the TA-4 during a syllabus tactics hop. It was the instructor's hope that we students could learn a lot by watching an engagement from the bogie's point of view. Little did they know how much I would learn that day.

The hop was briefed in detail with all contingencies covered. I was also given a refresher brief on the TA-4 seat and survival gear. The first engagement went as briefed, with me spending most of my time looking over my shoulder looking down the intakes of F-14s. Just prior to "knocking off" the first fight, we were in a slow-speed fight and our TA-4 had a mild slat departure. When we recovered, I cinched down my lap belts because I remember having the feeling of being well off the seat during the negative Gs.

On the second set up, we rechecked the lap belts one more time. Approximately one minute into the fight, I remember looking over my shoulder and seeing an F-14 that was getting ready to "shoot" us. I called for a break turn to the right. We were at 22,000 feet and 325 knots. I felt the "G" increase as we broke to the right, then suddenly the airplane departed violently to the left. I had the sensation that we tumbled end over end three to four times. I looked to the left and saw that the slat was out and made the call to the pilot that "It's a stuck slat." I then looked to the right and noticed that the right slat was out as well. I then called "It's not a stuck slat."

In a matter of moments, the TA-4 had entered an inverted, hesitant spin. Despite my tight lap belts, I was completely up off the seat and unable to read any of the aircraft instruments. My helmet was striking the canopy repeatedly so hard that the plexiglass started to crack in several places. The pilot hadn't said a word yet, and I wasn't sure what the aircraft was doing. It would hesitate for a fraction of a second upright, with the "G" unloading, then tuck violently inverted.

I finally saw the altimeter after six or seven revolutions. The hands were a blur but I saw them pass 14,000. It was at this time I made the decision to eject if the aircraft didn't recover after two more revolutions. At the completion of the second turn, I reached for the lower handle and tried to get myself in the best position I could. I closed my eyes and pulled the lower handle.

In less than a heartbeat, I was in the chute. My first sensation was how peaceful and quiet it was. I opened my eyes and looked around and saw briefing cards everywhere. I looked below and saw the TA-4 spinning as it entered the clouds. A little below and directly underneath me was the pilot, who appeared to be unconscious.

I couldn't believe it. I had survived the ejection, but I was sure I was going to die because my chute would collapse from being blocked by the pilot's parachute. I ended up running across the top of his canopy and getting clear. Then I inflated my LPA and deployed the seat pan. I looked down in wonder as the lower half of the seat pan with my "charms" continued on its merry way to the water. The raft had inflated but nothing was weighing it down with the seat pan gone. It flew up into my face, then behind my back, tangling itself around my legs.

Just as I settled back to enjoy my first and hopefully last parachute ride, an F-14 flew by. He was in obvious pursuit of an imaginary Japanese Zero that was attempting to strafe me in the chute. I'd heard of "train like you'll fight," but this was ridiculous! The F-14 made several pylon turns around my chute before I made it clear that I would prefer to die at the hands of the invisible Zero than be eaten by a Tomcat.

As I prepared for water entry, I tried to untangle the raft from my legs and get in it before hitting the water. The idea initially seemed sound; however, on second thought, I realized the upper half of the seat pan was still attached to my posterior. Knowing the raft would be damaged on impact with the water, I decided on a normal water entry.

When my feet hit the water, I released the parachute. My heartbeat had slowed to 250 so I took off my helmet and relaxed a bit. I was thinking life wasn't so bad.

I am happy to say the helicopter pickup went smoothly for both myself and the pilot.

So what are the lessons learned from this adventure?

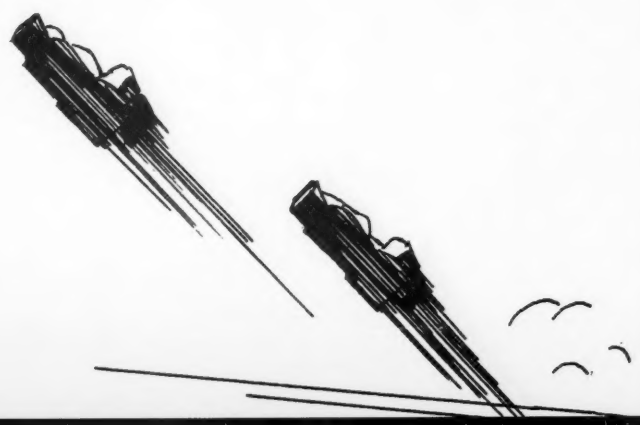
1. An inverted flight check prior to any maneuvering flight is an excellent way to ensure lap belts and loose gear are secure.

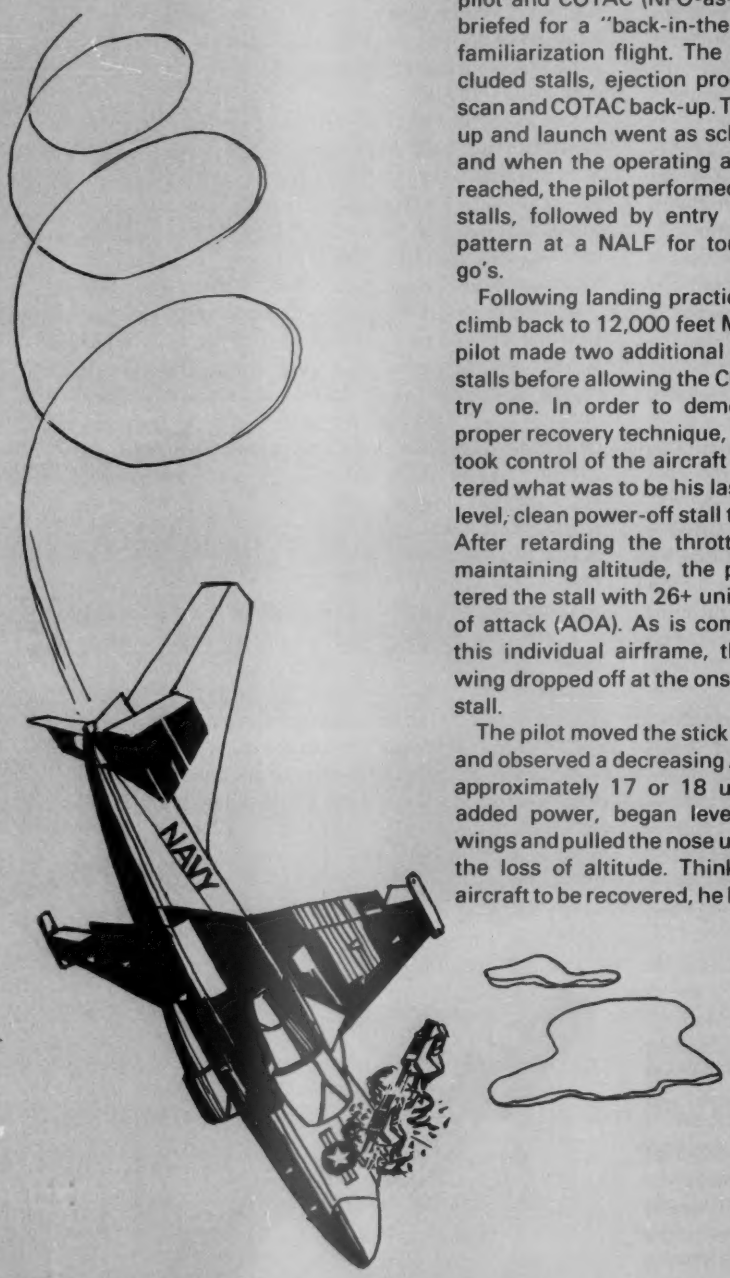
2. Only rely on the gear attached to your body. I wear the SV-2 survival vest with 5 pounds of extra gear.

3. You don't need to fly close to aircrew in chutes to let them know you are there. All you'll end up doing is soiling their flight suits.

4. Never believe it can't happen to you. I didn't and it did. Be prepared.

Lcdr. S.E. Collins is a Tomcat pilot in VF-21 and currently has over 2,300 mishap-free F-14 flight hours.






**Viking Stall Quals.** After a post-deployment leave period, the S-3A pilot and COTAC (NFO-as-co-pilot) briefed for a "back-in-the-saddle" familiarization flight. The brief included stalls, ejection procedures, scan and COTAC back-up. The man-up and launch went as scheduled, and when the operating area was reached, the pilot performed several stalls, followed by entry into the pattern at a NALF for touch and go's.

Following landing practice and a climb back to 12,000 feet MSL, the pilot made two additional practice stalls before allowing the COTAC to try one. In order to demonstrate proper recovery technique, the pilot took control of the aircraft and entered what was to be his last wings level, clean power-off stall that day. After retarding the throttles and maintaining altitude, the pilot entered the stall with 26+ units angle of attack (AOA). As is common to this individual airframe, the right wing dropped off at the onset of the stall.

The pilot moved the stick forward and observed a decreasing AOA. At approximately 17 or 18 units, he added power, began leveling his wings and pulled the nose up to stop the loss of altitude. Thinking the aircraft to be recovered, he began to reduce power. At this point, the Viking entered a secondary stall accompanied by a right roll and extreme nose-down pitch.

Almost immediately, the pilot saw the AOA again pegged at 26+ units, the turn needle deflected full right, and determined he was in a right-hand spin. He applied anti-spin controls — full left rudder and full forward and right stick. The aircraft continued spiraling downward with no sign of recovery. Passing 8,500 feet, the pilot told the COTAC he did not have control and to initiate command ejection. The ejection sequence followed almost as advertised, except that the pilot seat ejected a split-second prior to the COTAC's.

The entire out-of-control/ejection sequence was observed by the crew of a civilian Learjet operating in the area. The civilian pilot orbited the scene until a squadron S-3 could be vectored to take over as on-scene commander. The crew were recovered by Coast Guard helicopter and taken to a nearby hospital. The pilot sustained a strained neck and bruises to his right leg, probably as a result of poor ejection positioning while trying to fly the aircraft through the ejection initiation. The COTAC suffered first- and second-degree burns to his hands, arms, face and thighs.

*Burns of this nature are possible if one seat leaves before the other. The fact that the COTAC was not wearing flight gloves, had his sleeves rolled up and did not wear his oxygen mask compounded the situation.*

*Had the Learjet pilot not seen the S-3 right itself after the ejections and remain airborne for two minutes, this mishap might have been undetermined. Once flight control inputs were removed, the aircraft re-*

# AIR BREAKS

*covered. The primary cause of the loss of this aircraft was the pilot's failure to recognize a post-stall gyration, thus applying inappropriate recovery techniques. — Ed.*

**Do As I Say, Not As I Do!** The young sailor was engaged in towing a P-3, headed for the fuel pits. Prior to crossing the parallel runways, he dutifully called the tower for permission to cross. The tower told him to hold short of Runway 14R; an aircraft was approaching 14L for a touch and go. The tow operator for some reason assumed the active runways were 32, and misunderstood the clearance as "hold short 32R."

He therefore crossed 14R, intending to hold short of 14L/32R. When the tower saw the two crossing 14R, it immediately instructed the approaching aircraft to go around.

The tow operator was properly licensed and had received proper instruction on field operations. Only the quick reaction of tower personnel salvaged a dangerous situation. The tow operator's misunderstanding of his clearance was perhaps based on his expecting something else. He heard what he wanted, or expected to hear. As the individual's squadron commanding officer commented:

"Complacency can kill just as easily on the ground as in the air . . . the error of the tow operator should be a warning to air and ground crew alike. We must always ensure what we expect to hear doesn't cloud our interpretation of what we are told."

**Please! Don't Take It With You!** Prior to each flight, the flight crews inventory and inspect required safety equipment carried by their C-9Bs. Over the last six months, 16 passenger life vests have been discovered missing, and the culprits appear to be the on-board passengers! Why someone would pilfer such an innocuous item as a life vest is open to conjecture. The souvenir value is limited unless you have a kapok fetish. As far as using them in other areas of water activity, these life vests are unsuited for recreational use.

The consequences of missing life vests during an emergency situation — when they are needed — could be tragic and unnecessary. Various logistical squadrons could, if they felt the situation warranted, hold deplaning passengers until a thorough check of safety equipment was made. The procedure would certainly not be popular and would inconvenience many for the irresponsible actions of a few. Coincidently, the theft of a life vest from a commercial airliner is a federal offense.

**Gimme a Light!** Two H-46s were in the LHA night touch and go pattern. The weather included thick haze and no moon. The LHA was operating in company with an LPD and LST, with the LST in plane guard station. Two thousand yards separated each of the ships. The LPD began transmitting a flashing light message to the LHA. The amber light used for the message was identical to the CH-53 lower rotating anti-collision light, and when the HAC of the first H-46 saw the flashing light, he mistook it for an unannounced Sea Stallion, broke off his approach to the LHA and quickly climbed to 1,000 feet.

The HAC in the second Sea Knight saw the light, too, and thought a midair with the "phantom" CH-53 was imminent. He made a radical evasive bank to the right.

Fortunately, aside from elevated blood pressure and racing heart beats, this potentially dangerous situation did not result in further complications. Both HACs were seasoned aviators, with 18 and 12 years experience, respectively.

*Night flying involves any number of variables which are of little consequence to daytime flyers. The players must know who the other participants are. Perception of visual cues are not always what they seem. — Ed.*

**Phantom Phlail-X.** Shortly after pushing out of Marshall on a night carrier refresher mission, the Phantom pilot experienced flight control difficulties. Stick movement right of center required approximately 35 pounds of force and little roll resulted. The pilot and RIO discussed the situation and initiated a bingo to the divert field, while informing the ship of the difficulties and intentions. The RIO handled the radios, contacting approach control, declaring an emergency and requesting a straight-in approach with minimum angle of bank left turns.

Although the Phantom was now low fuel state, the crew stuck to established procedures, lowering the landing gear and flaps 10 miles out at 5,000 feet AGL. As the aircraft approached 170 KIAS, it commenced an uncommanded left roll. The pilot tried to counter the role with fully-deflected right stick to no avail. He then applied full power with full right rudder and finally regained control. It was quickly decided that the aircraft's minimum controllable airspeed was 190-200 KIAS.

The RIO told the tower that a midfield arrestment would be required. The pilot brought the F-4 down the runway at 195 KIAS; the RIO called for the hook half-way down the runway and an uneventful midfield arrestment was made.

# The Squadron Navigation Officer and DMA

By Lcdr. Gary Tarbet

RECENT problems brought to the attention of the Defense Mapping Agency (DMA) have highlighted the importance of a good squadron navigation officer. Without current and adequate Flight Information Publications (FLIPs), no squadron can safely complete its mission. After talking to various naval and Marine Corps squadrons, it is apparent that numerous misconceptions exist concerning the requisitioning of navigational products. It is the goal of this article to answer questions such as: What is FLIP material? How do I change the quantities/products I am receiving? Where do I get help if I've got a problem? While this information is available in the DMA Catalog of Maps, Charts and Related Products, Part I, Aerospace Products, it is hoped that this article will be retained as a quick reference for new navigation officers.

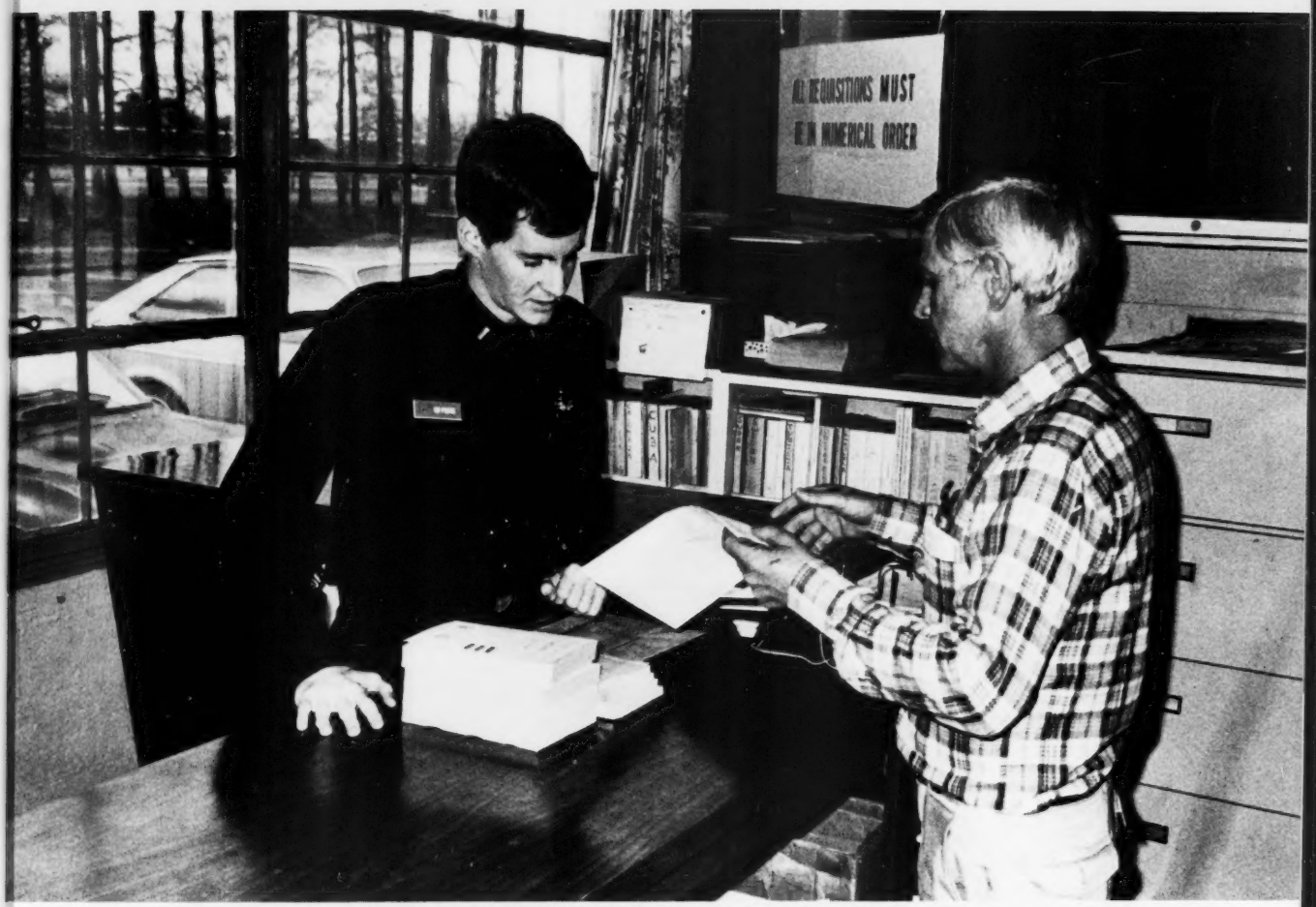
The DMA Aerospace Center in St. Louis, Mo., is tasked to provide all military services with a series of publications covering flight planning, en route navigation and terminal phases of flight operations often referred to as FLIP. FLIP materials include Planning Documents, the Flight Information Handbook, En-route Supplements, En-route High and Low Charts, Wall Planning Charts and High and Low Terminal Procedures. Other products such as tactical pilotage charts (TPCs), global navigation charts (GNCs), foreign clearance guides, sectionals, FAA handbooks, FAR parts and DMA catalogs are also required by most squadrons. These materials are considered to be FLIP-related products. FLIP-related materials are controlled by the DMA Office of Distribution Services (DMAODS) in Washington, D.C. Because FLIPs and FLIP-related materials are controlled at different locations, an aviation squadron has two different DMA account numbers.

Each of these accounts must be verified on a yearly basis. Unfortunately, when these computer listings arrive, a lot of squadron navigation officers just sign them and return them to DMA hoping nothing goes wrong on their watch. Your printout is a complete listing of the products being shipped to your unit on a recurring basis. If you are continually throwing away items or have a need for additional material, this is a good opportunity to make these corrections and make sure that your squadron doesn't come up short. It is also an opportunity to prevent the expensive waste that results when you get pubs you don't need. If you need help in determining your quantity levels, review section 4, Basis of Distribution Table in the DMA Aeronautical Charts and FLIP Catalog, or call the appropriate FLIP account manager listed in section 3 of that catalog.

Once the account levels have been set, your only worry is the timely arrival of updated information. All FLIP material has a limited use period. Flying with outdated FLIP material can be hazardous to your career and health. So what do you do when new charts haven't arrived at least one day prior to the change data? First, look around the squadron mail, maintenance and administrative areas. Many boxes of FLIP material have been found in very strange places around squadron spaces. If this search doesn't turn up anything, then determine how your product normally arrives; i.e., via supply or via the mail. If your account uses an FPO address then FLIP products are received via the mail. If you are a shore-based establishment, then the product will be shipped through supply, the U.S. mail or UPS. Contact your normal carrier and have them search for the product. If these searches

Providing the products you need to perform your mission — is DMA's mission.
For any assistance contact:

| Location: | FLIP Account Manager: | Phone: |
|---|---|---|
| DMA Office Norfolk | Mr. Ray Pennington | (804) 444-4243<br>Autovon 564-4243 |
| DMA Office San Diego | Ms. Pat Cole | (619) 437-6231<br>Autovon 951-6231 |
| DMA Office Pacific | Ms. Poliala Katschman | (808) 449-5491<br>Autovon 287-2834 |



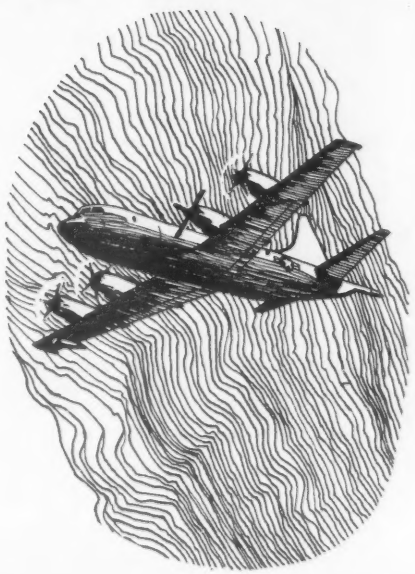

A squadron navigation officer checks out some pubs at DMA Office, Norfolk.

are not productive, contact other nearby FLIP users to determine if they have received their material. Even if this doesn't help you directly, it will provide DMA with some required information. At least 24 hours prior to the change date, call your account manager listed in the catalog and explain your situation. DMA is very concerned about your safety. If late delivery is a recurring problem, inform the account manager. It is only through documented cases that the system can be fixed.

What about the FLIP-related products? As stated above, these products are controlled by DMAODS Washington, D.C. You can refer problems to their customer assistance desk at Autovon 287-2426 or call your FLIP account manager for assistance. Correct procedures for this type of order are discussed in the Aeronautical Charts and FLIP Catalog, section 2, Ordering Procedures. If your squadron does not have a current catalog, then contact your account manager or one of the three offices listed below for assistance.

One last suggestion: All DMA offices have personnel assigned to provide education on how to use the DMA system. The offices in Norfolk and San Diego provide weekly scheduled seminars. These are free and they provide a wealth of useful information. If you are assigned to a base outside of these areas, arrange for a visit by a DMA representative. This seminar information can be brought to your area. ◄

Lcdr. Tarbet is the officer in charge of the DMA Office, Norfolk.



# Engine Operating Techniques in t

By Cdr. Richard P. Shipman

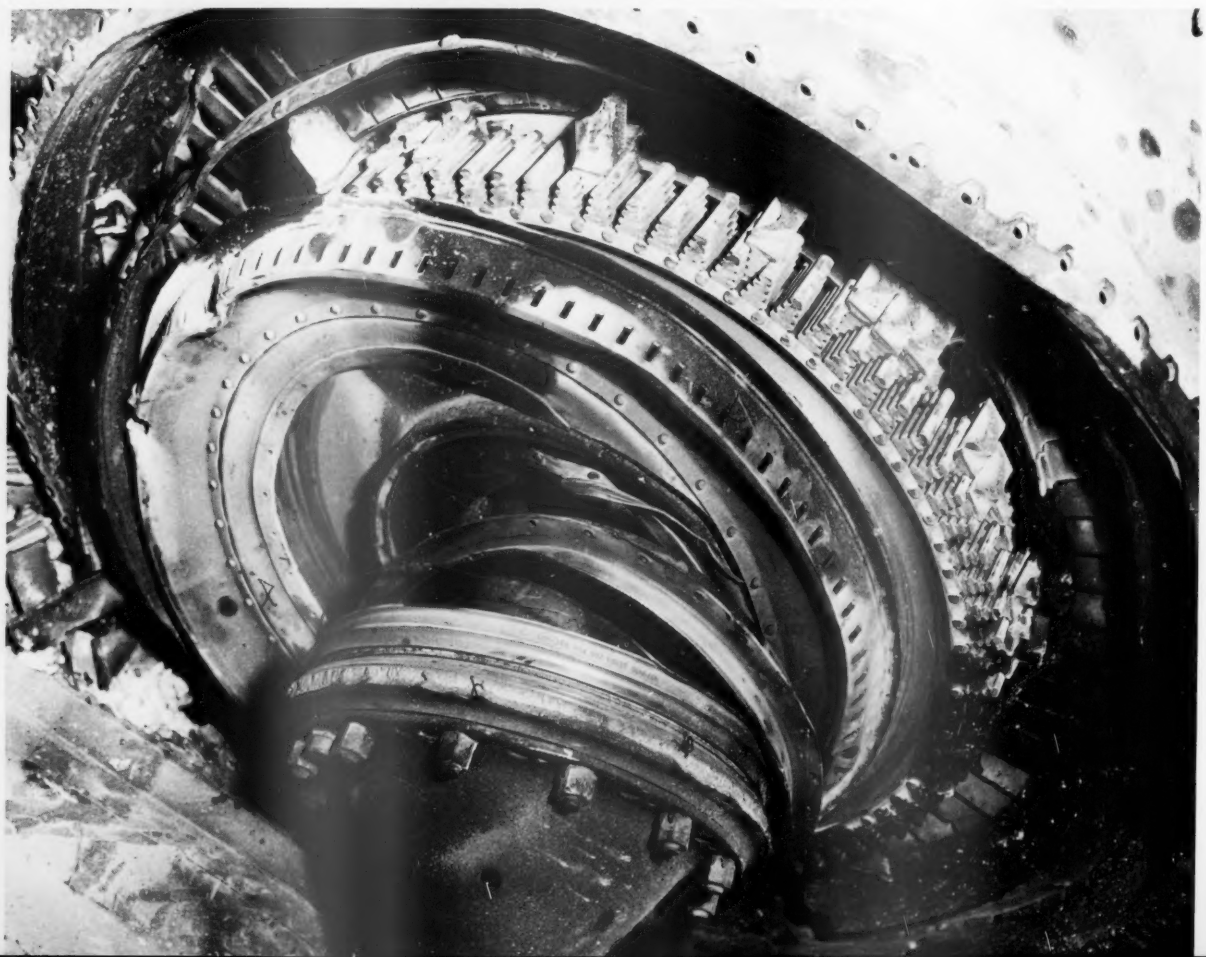
ASK a typical naval aviator what his responsibilities are in relation to his aircraft and he would probably give answers along these lines:

- Be intimately familiar with the aircraft operating envelope
- Know emergency procedures cold
- Be thoroughly knowledgeable about aircraft systems
- Adhere scrupulously to NATOPS limitations

Most likely missing from this list would be "conserve engine life." Since the mission of naval aviation is combat readiness, not preservation of engines, good engine operating techniques are not given as much attention as other facets of flight operations. Yet, as a professional naval aviator, if you can do something that would save money, increase aircraft availability and make flight operations safer — without compromising combat efficiency — you would certainly do it, wouldn't you?

The commercial airlines, accutely aware of engine purchase and overhaul costs, strive zealously to operate their jet engines in the most conservative manner. Reduced thrust takeoffs, carefully monitored EPRs (engine pressure ratios) on climbout and precisely computed power settings for missed approaches are the norm. Obviously, the mission of naval aviation is completely different than civil aviation. The shorter engine life associated with the Navy's necessarily harder operating environment is simply a cost of doing busi-

Exceeding engine operating limits can have disasterous consequences.



# n the TACAIR Community

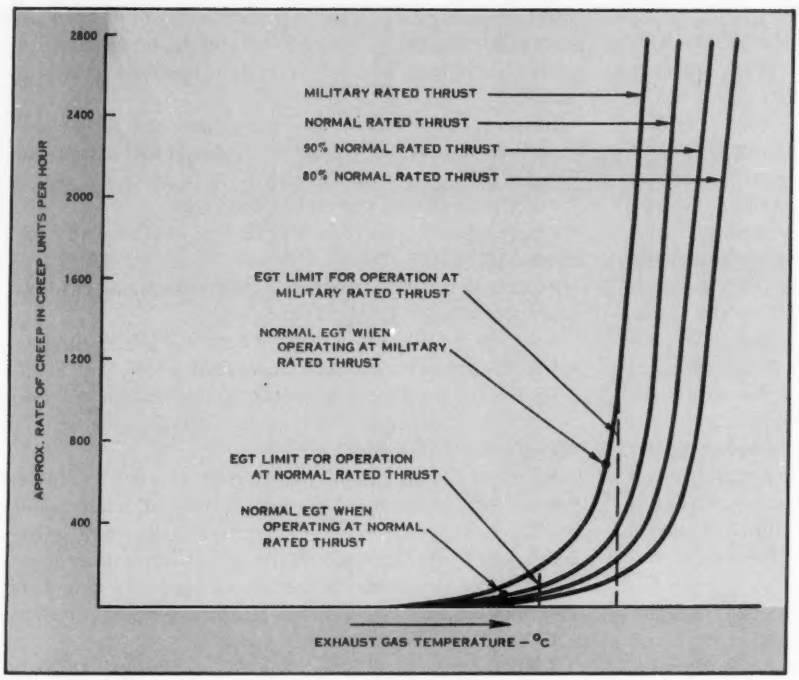



Fig. 1. The turbine blade creep rate increases dramatically at high temperatures.

. . . There are many circumstances where engine life could be extended through a better awareness of some basic jet engine facts of life and a few simple procedures . . .

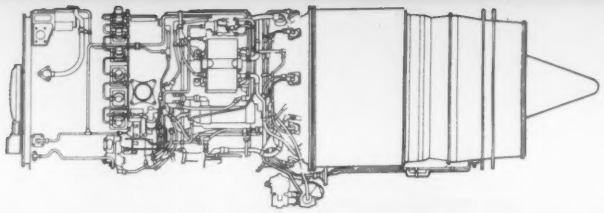
11

ness. But there are many circumstances where engine life could be extended — without compromising readiness — through a better awareness of some basic jet engine facts of life and a few simple procedures. Some elementary points about jet engine longevity may help explain.

Heat is the archenemy of the turbine engine. Since high temperature is necessary to produce high thrust, you can also say that the more you run an engine at high power, the shorter its life is going to be. All metals have melting temperatures, and the strength of material decreases as temperatures approach the melting point. Short of melting, metals tend to deform in a manner related to the stresses placed upon them. Metals stretch when a pulling load is applied, such as is produced by centrifugal forces applied to turbine blades during rotation of the turbine wheel. Furthermore, a metal's tendency to stretch permanently increases with load and temperature. Thus, the amount of permanent set increases with the length of time the load and/or temperature is applied.

In the case of turbine blades in a typical jet engine, the centrifugal force of the rotating turbine in conjuction with the high operating temperatures of exhaust gases causes deformation in the form of lengthening of the turbine blades. This turbine blade "creep" is one of the greatest problems in jet engines and is one of the major reasons for premature engine overhauls or failures.

So what can the average fleet aviator do about all this? There's nothing a pilot can do to totally eliminate creep, but he does have control over the magnitude and rate of creep in the manner in which he operates his engines. As can be seen by figure 1, creep rate does not increase in a straight line from low temperature to high. Instead, the creep rate shoots up dramatically at the higher operating temperatures. Thus, at high power settings such as takeoff and climb, an increase of five degrees of exhaust gas temperature (EGT) or turbine inlet temperature (TIT) can *double* the rate of turbine blade creep. If the EGT/TIT limits are exceeded, a Pratt and Whitney bulletin states that the rate of creep can increase almost 1,500



. . . Turbine blade "creep" — deformation or lengthening of the blades — is one of the major reasons for premature engine overhauls or failures. . . .

times within a matter of seconds.

All NATOPS manuals have time and temperature limits for engine operation. In the case of the J-52P-6B, for example, the engine is limited to 621 degrees Celsius EGT and 30 minutes at military (full) power. The EGT/TIT is a critically important figure because of heat and strength limits of the internal engine components and, as noted above, creep rates. Exceeding the maximum EGTs/TITs for the various phases of operation will result in, at best, greatly reduced operating life, or at worst, in engine failure due to turbine blade disintegration. The operating time limits are also important, but probably for different reasons than envisioned by most pilots.

The purpose of time limits is to allocate that portion of high temperature time designed into the engine over the anticipated overhaul cycle of the engine. Thus, exceeding 30 minutes of military operation at one time in the J-52, for example, will not cause the engine to fail (assuming temperatures are within limits), but it will result in an accelerated creep rate and reduced overhaul time. Therefore, nothing is accomplished by pulling the power back briefly after 30 minutes of full power operation just to meet the letter of the law. The optimum cooling condition is met when reduced thrust operation is conducted for the same length of time the engine was operated at high power.



In addition to prolonged operation at high power, dangerous internal temperatures are generated during hot starts and compressor stalls. In fact, overtemps in these categories are particularly serious since cooling airflow through the engine is reduced in these situations. Compressor stalls are especially dangerous since airflow through the engine is virtually stopped when the compressor stalls. Therefore, it is extremely important to avoid hot starts and compressor stalls, if possible. If not, at least be sure to document every instance of compressor stalls or hot starts for maintenance personnel.

OK, this is all well and good, but what can you do to maximize engine life without jeopardizing your reputation as the ace of the base? No one expects you to run at reduced power on climbout for an intercept or to eliminate throttle snaps between military and idle during a rolling scissors (or a rendezvous). But what's wrong with climbing out from home base at military minus 3 percent en route to the operating range or on a cross-country? Or how about flying the airways at max range airspeed (with the resultant lower temperatures) rather than pushing up the power to arrive a few minutes early? It would also be feasible to reduce takeoff power a few percent when gross weight, runway length and temperature are not a problem. After all, that's done routinely on section takeoffs.

In summary, several things come to mind that the jet aviator can do to minimize engine wear; almost all relate to one thing: *reducing the heat*. They are:

- If you don't need full power, don't use it.
- Scrupulously adhere to temperature limits for all operations.
- After operating at military power, reduce power for an equivalent period of time, if feasible.
- Avoid bringing the throttle around the horn below the NATOPS recommended minimum RPM.

Even though the start temperature may remain in limits, the increased heat caused by the reduced airflow through the engine will shorten engine life.

- Reduce the throttle immediately in the event of a compressor stall or in an out-of-control flight situation which would interrupt airflow into the intakes (unless your particular aircraft NATOPS manual calls for a different procedure).
- If a compressor stall or hot start does occur, document the condition plus record the maximum temperature attained and time at that temperature, if possible.
- Move the throttle slowly if there is no tactical reason to do otherwise.

Unlike the airlines, the Navy mission is not profit-oriented and, thus, engine conservation programs have not received much emphasis. In these days of money and engine shortages, however, it only makes sense to do as much as possible, short of compromising the mission, to conserve these valuable assets. Besides, as professional aviators, we should do everything possible to keep our weapon systems in the best possible condition. Therefore, doesn't it make sense to save the power for when you really need it — such as in an ACM engagement or rolling in on a target with a full bomb load? A little common sense in engine operation can pay big dividends in engine life — not to mention personal longevity.

*This article is directed toward tactical jet aircraft but the principles also apply to turboshaft and turboprop powered aircraft. — Ed.* ◄

Cdr. Shipman is a reservist with Volunteer Training Unit 8686 at NAS Norfolk, Va., currently on special assignment to Approach. On active duty, he served tours as an A-4 instructor, a fleet A-7 pilot and as an assistant flight deck officer. He is currently a 727 pilot for People Express Airlines. The author would like to thank Mr. Tom Pearson, NAVAIRLANT Powerplants section, and MSSRS Lou Rutherford and Tom Ring of Pratt & Whitney for their assistance in this article.

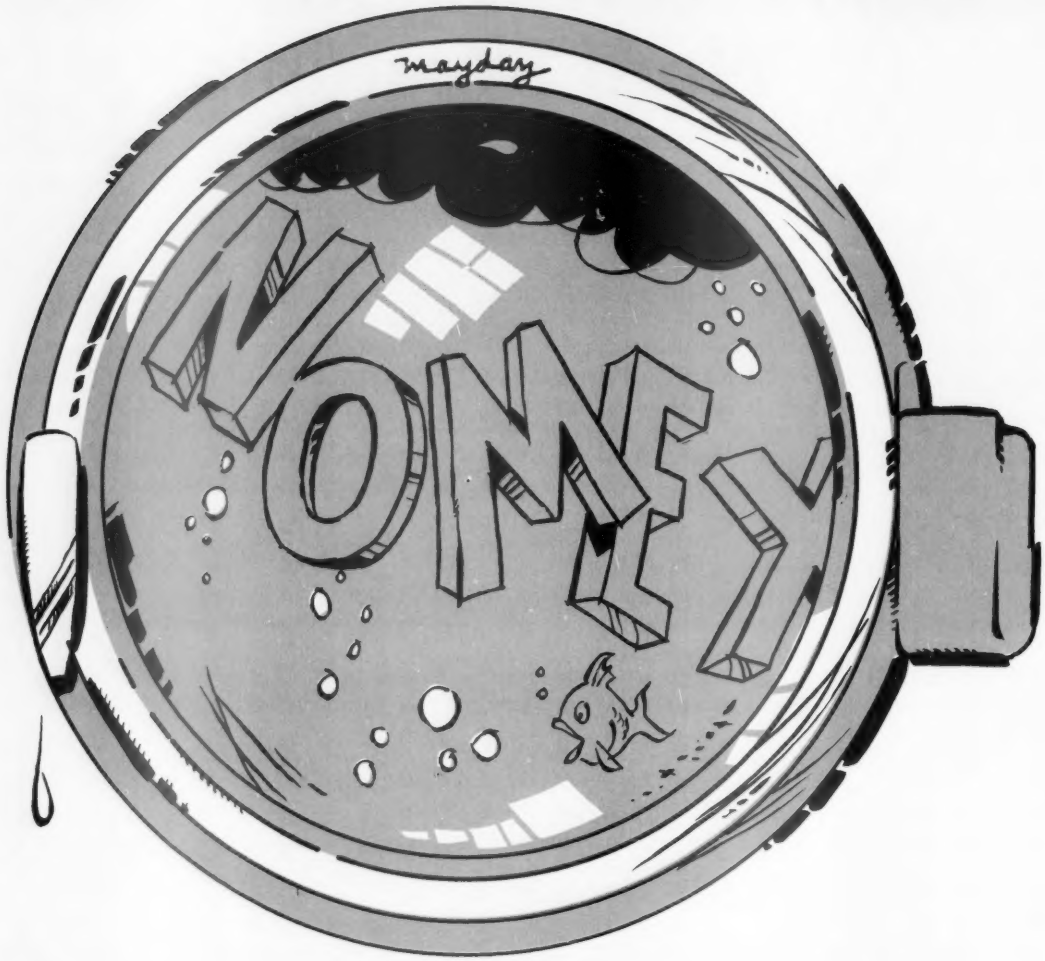
# Celestial Navigation Aids Word Scramble

Using the words at the bottom of the word scramble, circle appropriate letters to spell each word. Words may be spelled forward, backward, diagonally or up and down.

G U O N A K W X P I N H K G L R R T E O M W L K C T D V L C
A D F L J P D M U O E G A T S V V J H D Q B P Z S D S Q S X
S P M U B Y J P B O L Y J E P F W M D N S C V B N U H A H N
P R F K X P L N Q V T A I J S T H G M C D J W A X H A D D A
I Z Z B O Z F S X Y N R R W H I F N M U I R V L E C J K N H
T O G L Y O M S D U A R M I B B R M N D D O T L C N W F O Y
O U L B O N M J U I R O N X S T L I C X P C Z E O I F D G X
F U M W I Z N J G N B Y V R A N R A U N U J M P W V M O Q Y
X O H V Q I M D O I P J Z F S K F U F S J S O A U J G S R G
P X Q R I E Z W C G M T M Z V Q E U B Z B L C C G J J K I K
A G R K Z N N U A X S X W E G W J K Q F L N E V I L J I W J
L K M U T O C E G L R X G B K H A N S A J B M S L E A I U G
M F A F Y K K B J M D A O D P I C T N M G H T M O G X R Z A
S Q N T L M W F S L N E G A C P X T Z C Z N K W Y K N N Q C
T N T J J G Z Y K L E V B J U Z B F E D D Z O I A R Y D W Y
Y G X R V P O G X O F A V A I K C H A R P T M O U S Y A G V
U W X D Q S B O J N O K S H R L P Y J G I W S T M F O K X D
Q I L P U V W E S I G N A D T A M S Y Z H G A V R T S T Q Q
K W X N T R S U W R B X K H H I N G F Z Q S E C V M O B Q D
G N E U T P K Q A I T H X Q R K D F L X P B X L E R L H H N
P V J A Y Q H F K U Z B T T L C J Y O K L M P N S M X V G Z
M Y H U X G T J Y R P L A I I I S B X Q O S L Y M P W H L O
Z R C A P Y Q U O H A H Z S W V S R V P I Z Y Z S Y W G R H
B W K K D I P R J D F L U Z B B D U O S F E B P O F F I R P
A Z L I T N T M V P M G M U M S O S O D O P K C C H A F P U
L E O V U E Y E X S N I L A V S Q M B V G Q M L V T D M Q C
S A M Y S U A Q R H Q J N S N C D I F Y B I V A L S I Q F O
U Y C Z D W X I N H D S N H B A Z C C T K R U A N R H U I Q
J D C S N Z U U A R S O C E O N C U Y X K K C K J T S I L Z
N Q U Q Z G X H D W J E T N V S Q S F G E B I Q L U E T Y N

Find these words in the above puzzle:

| | | |
|---|---|---|
| Aldebaran | Almanac | Altair |
| Aries | Capella | Jupiter |
| Moon | Polaris | Pollux |
| Rigel | Saturn | Sirius |
| Sun | Vega | Venus |




# N—O—M—E—X spells PROTECTION

By Jim Clark

NOMEX is a trade name for the material developed by Du Pont used in the manufacture of protective clothing for air crews. The fabric is made from high-temperature-resistant aromatic polyamide fibers with the generic name of ARAMID. The correct designation is NOMEX ARAMID fiber. The fire-resistant qualities of the fabric are not derived from a treatment applied to the cloth, but rather are the result of the molecular structure of the material itself that prevents it from melting.

The early Nomex fabrics were made from continuous filament fibers — unending fibers which were woven into fabric used for anti-G suits, and other applications where strength, in addition to fire resistance, was an all-important factor. Such fabric, however, lacked the qualities needed for a soft and comfortable material to be used in garments worn every day.

Use of a fabric softener is for a more subtle purpose than to make them soft and comfortable. The softener acts as a fabric lubricant and moisture retention agent. It won't destroy the fabric's fire resistance.

The continuous filament was replaced by short fibers which were chopped up and made into yarn in a process much the same as that employed on an old-fashioned spinning wheel. The material made from the resultant Nomex threads is not only highly resistant to fire and heat, but is resilient, lightweight and comfortable to wear. It also retains the required strength. The standard items of apparel made from this fabric are flight coveralls, jackets, shirts, trousers and gloves.

This flight gear should be reserved for actual flight operations and never worn for general maintenance activities. Grease, oil, petroleum fuels and other dirt and grime will degrade the fire-resistant properties in the contaminated areas. Maximum protection requires that the sleeves be worn down, the cuffs fastened and the bottoms of trouser legs fastened and shirt tucked into trousers. *Never wear synthetic underwear with Nomex.* Synthetic underwear melts. Who wants a batch of melted underwear hung around his equator? Changing to clean underwear before each flight is also strongly recommended. In the event of an accident involving burns, soiled clothes can produce infection.

CARE, of the "tender, loving" variety, is the magic ingredient that will ensure maximum protection from your Nomex garments. The No. 1 preventive maintenance action for your Nomex clothing is to keep it clean. There is nothing magical about the cleaning process. Nomex can be dry-cleaned, hand-washed or run through the home automatic or a commercial type unit. To obtain the best results, follow these simple instructions:

- Turn all pockets inside out; brush away dirt, gunk, bits of paper, threads and any other assorted trash. (Retrieve any paper money for future use.)
- Close all zippers and hook-and-pile (Velcro) fasteners.
- Use a water temperature of medium-hot to hot (to a maximum of 140 degrees Fahrenheit).
- Add enough powder detergent to make plenty of suds.
- Use a commercial fabric softener. Stop the machine and add it before the last rinse cycle starts.
- Wash at least five minutes; rinse four to five minutes; spin dry one to two minutes. Tumble dry, or hang in shade to drip dry. (Dryer temperature should not exceed 180 degrees Fahrenheit.)
- Launder your Nomex as soon as possible after a fuel spill.
- *NEVER* use starch — it will BURN! And there go the fire-resistant properties. If some laundry type adds starch in the washing cycle, don't panic. Just run the Nomex through the rinse cycle a couple of times, dry it and wear it with confidence.
- You can touch up Nomex with an iron, but never iron the hook and pile (Velcro) fasteners.

Some special tips apply to Nomex gloves. You can wash and rinse them like you do with other Nomex clothing. Or you can put them on and wash them with soap and water as if you are washing your hands. But never wring them out by twisting them and never dry them in a dryer or with any other heat source, including direct sunlight. Instead, squeeze the water out of them, lay them flat on a clean towel and roll them up in the towel, making sure the two gloves aren't touching. Leave them in the towel for an hour or so and then air them out in a cool, dry place. They will have to be stretched back into shape the first time you put them back on.

Never wear Nomex gloves when working around equipment where they can be soiled with grease and oil. They're supposed to be worn only when operating aircraft. You may need a softening agent for the leather palms. Use neat's-foot oil or saddle soap. Don't be perturbed if the oil turns the leather darker.

Use of a fabric softener as recommended above is for a more subtle purpose than to make them soft and comfortable. The softener acts as a fabric lubricant and moisture retention agent. It won't destroy the fabric's fire resistance. You'll notice that the amount of static electricity is reduced too. This is most important, and here's why:

Natural fabrics like cotton and wool generate static electricity when they rub against synthetic materials such as polyester or Nomex. Your body is a natural conductor and can hold these charges up to several thousand volts. Most of this is drained away through your shoes into the floor. But as we all know, it can often cause sparks when you come in contact with another person or a metal object, or remove a piece of clothing. This is usually only annoying, but it can be dangerous if you are around highly flammable materials.

For instance, when you take off Nomex clothing that is fuel-soaked, your movements could cause a static electricity discharge that could set the clothing on fire. If you do spill fuel on your Nomex clothing, move slowly away from the area. Get at least 50 feet clear of any fueling operation. Hose down your clothing before taking them off. If you can't soak your clothes with water, grab hold of some grounded, bare metal with both hands. Hold on to it for a few seconds. This will equalize the electricity between you and the grounded object. Remove your clothes slowly and carefully.

A little skin irritation from the fuel won't kill you; the fire following a static discharge could!

FINAL ADMONITION — TAKE CARE OF YOUR NOMEX, AND IT'LL TAKE CARE OF YOU! ◄

*Reprinted by permission from Northrop's F-5 Technical Digest.*

Mr. Clark is a retired senior technical specialist with Northrop's Product Support Division.

# "Who's got the Nav?"

By Lcdr. J.T. Hastings
Reserve Patrol Wings Pacific



A P-3 crew, using the latest in sophisticated navigation systems, launched on a routine navigation training mission. The brief called for a specific track to be flown. Few turns were planned because the entire route predominantly ran due east. After securing UHF communication with the local flight following agency and gaining safety of flight on HF, the crew performed a routine navigation system update by refining the aircraft computer position using the self-contained dual inertial navigation systems. Despite some minor confusion in this update procedure, the crew continued its mission.

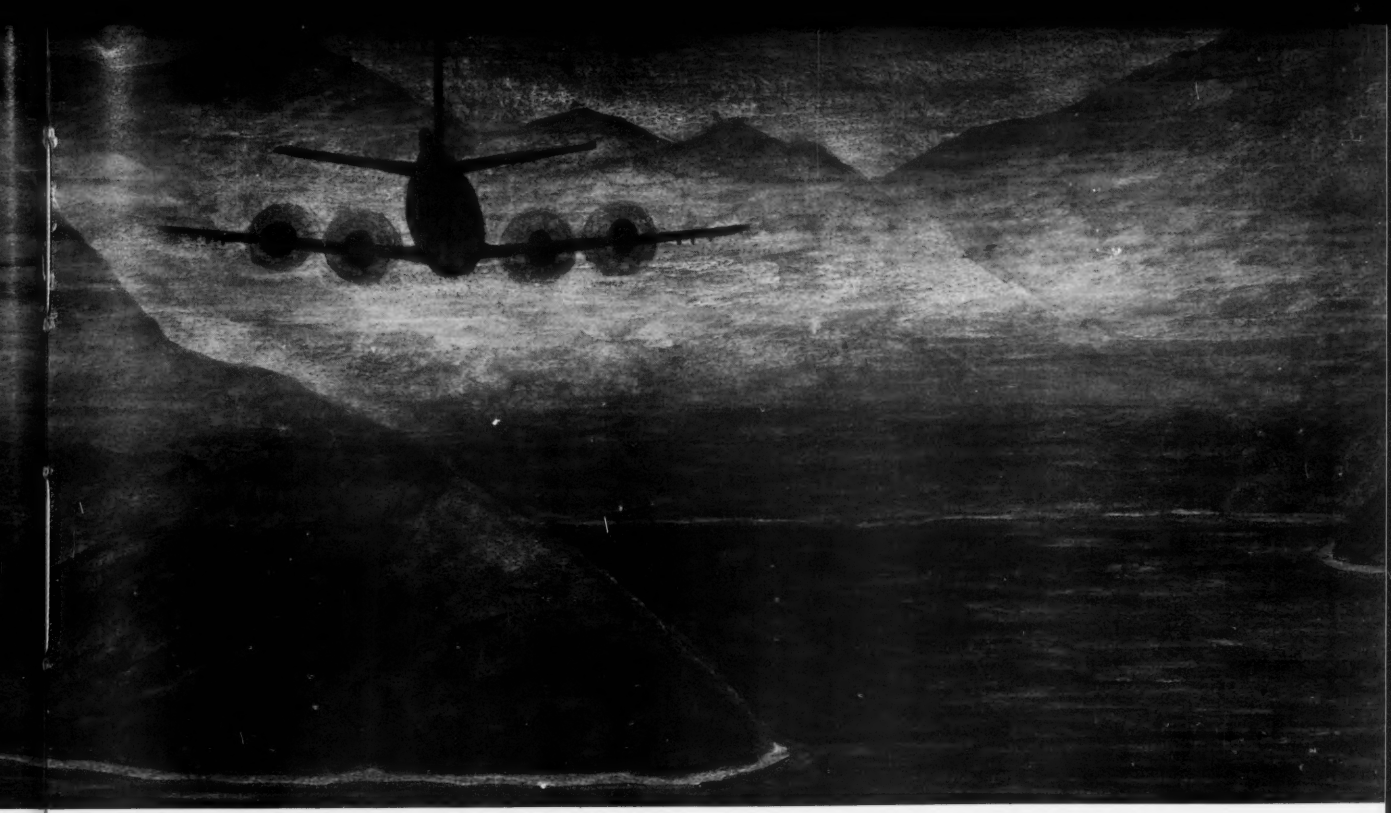
When the aircraft arrived at the off-station point three hours later, the crew was surprised to discover that for the last three hours the navigation system had been over 100 nautical miles in error! They had, in fact, been flying 100 nm to the right of where they thought they had been. They found that the initial position update at the beginning of the flight was erroneous. Of course, since they had been 400 miles off the coast, no harm done. But the list of potential disasters that could result from this kind of error is endless.

In the volumes of aviation safety articles written over the years, how many times have we heard or read the age-old question, "Who's got the aircraft?" Confusion over responsibility for control of the aircraft has been the cause for numerous aircraft mishaps and incidents since the inception of dual controlled flying machines. Rarely, if ever, can I recall hearing or reading the phrase "Who's got the nav?" The relevance of this question becomes critically apparent in the following story.

The experienced P-3 crew arrived for the tactical mission brief at zero dark-thrity. The TACCO (tactical action officer) arrived early to review the mission and operational scenario. The aircraft took off and headed for the operating area, which, along with the last known position of the submarine, was in proximity to a coastline. Weather in the on-station area was reported as overcast with visibility obscured in clouds when the P-3 reported on station. The radar operator asked how high the tallest mountain on the coastline was. The navigator replied 5,600 feet.

The radar operator, after scanning for surface contacts, brought up the infrared detection system (IRDS). Since the previous on-station aircraft was being prematurely diverted, the TACCO hurriedly began copying the turnover information. The pilot inquired if the radar operator was having any luck with the IRDS. The radar operator responded that he was having difficulty because of all the clouds below. A VFR descent to the on-station assigned block altitude of 3,000 to 5,000 feet followed.

During the descent, the TACCO formulated his tactical plan and coordinated the ordnance and sensor operators in preparation for their search for the submarine. The flight station was involved in loiter procedures for the No. 1 engine. The aircraft leveled at 4,500 feet. The pilot in command announced to the TACCO that they could descend to 3,000 feet. The TACCO responded he'd like to stay at 4,500 feet for communication purposes until establishing contact



with the submarine.

The pilot advised the TACCO of their proximity to land. The TACCO acknowledged this statement and responded that he showed their position pretty much out of the previously established tactical pattern, but that's where his projected datum was. The TACCO requested the radar operator to scan off the right wing with the IRDS for contacts. The radar operator replied that there were so many clouds outside that he could hardly see anything with the IRDS. The pilot said to the radar operator that he would descend, since the aircraft had entered the clouds. The TACCO acknowledged.

Personnel in the area stated that they then saw a tremendous, bright flash lasting about 30 seconds.

The P-3 impacted the mountainous coastline, killing all aboard.

It is difficult to understand how well-qualified crew members in an aircraft such as the P-3 with sophisticated navigation systems can fall victim to one of the basic precepts of aviation, that of terrain avoidance. In this tragic mishap, key crew members were aware that their aircraft was flying in proximity to a land mass at an altitude lower than that of the highest terrain. The pilot and the TACCO discussed this proximity to the coast less than six minutes prior to impact; however, action was never initiated to assure the aircraft was well clear of the terrain. Each key crew member thought the other was cognizant of the aircraft's flight path relative to the island. The tactical crew assumed the flight station had a visual fix on the terrain. The flight station assumed the TACCO had accurate fixing information relating the aircraft's position to the land mass. Everyone assumed the navigator had an accurate plot of the terrain or that the radar operator had the situation well in hand.



There were many factors which contributed to the confusion over navigational responsibility leading to this fatal mishap. During the descent, the pilots transitioned from visual meteorological conditions to instrument conditions and made a statement to the TACCO concurring their proximity to land. This might have been intended as a warning, but perhaps was interpreted by the TACCO that the cockpit was maintaining navigational responsibility. The TACCO and navigator were preoccupied with the tactical situation and plotting duties. The radar operator was preoccupied with the IRDS. The intensity of the activity of these and other tactical crew members was heightened by the earlier than anticipated onstation time caused by the early departure of the relieved aircraft. The flight station was preoccupied with the loitering No. 1 engine.

There were undoubtedly other contributing factors in this mishap. However, it is obvious that a major cause was no clear assignment or crew awareness of who was responsible for the navigation to assure terrain avoidance. After reviewing this tragic aircraft mishap, perhaps the phrases "You have the nav!" and "I have the nav!" should become more commonplace in aviation. ◄

Editor's Note: This is not an official account of any actual mishap.

. . . As they unfold in combat, emergencies can demand different handling than they would on a peacetime training mission . . .

# Emergencies in Combat

By 1st Lt. Vincent J. Constantino, USAF

AFTER sitting in a combat air patrol (CAP) for a full cycle each day for the last eight days without any action, you are understandably excited when your two-plane finally is committed by AWACS. Two contacts. You see their pincer and deploy your wingman to out-bracket them. The shots are called and, going pure-pursuit at 10 miles, you obtain a tally. Then at eight miles, a master caution light appears. A glance at the caution panel shows you have just had a major hydraulic failure. The two MiGs are closing fast. What would you do?



You say, "Well, first I'd call 'Knock it off,' then I'd start a climb . . ." Try again.

"Well, I'd pickle a Fox 1, get a tally-ho through the TD box, select full afterburner, hit the deck and blow through supersonic." Still not right.

Discussion of emergency procedures (EPs) usually assumes a benign environment, i.e., daytime, in the local area, CAVU. What if you are engaged with a Flogger over enemy territory or rolling out on final for a low angle pass? It could even be at night. "Knock it off and climb" doesn't hack it when you see the proverbial master caution light. But neither does going full burner and hitting the deck, necessarily. My point is that, as they unfold in combat, emergencies can demand different handling than they would on a peacetime training mission. Like anything else we do, some thought, discussion and good use of simulator time will prepare us for most situations.

The purpose of this article is to bring up some ways in which EPs might be dealt with differently in a tactical (real combat) environment.

This is meant to be a provocative treatment. Pilots with experience in combat tend to have very strong ideas about certain EPs, and some may even have had an engine fire or a hydraulic leak or two over Southeast Asia. If you know anyone like this, tap this insight, even if it means having to buy him a round or two at the club. Finally, I suggest incorporating these topics into flight briefings.

I wish to emphasize at the outset that the suggestions and facts printed here are *not* prescriptions for action in peacetime. Nor should it be read as a cavalier interpretation of published emergency procedures. I simply acknowledge that priorities may be different in combat when you are about to be shot!

Certainly, three basic steps still apply, with qualifications:

**Maintain aircraft control.** Of course. If you hit the mountains, that solves the enemy's problem.

**Maintain situational awareness.** It is important that you remain aware of what is going on around you. Try not to focus all your attention inside the cockpit. Is your machine flying normally? How are the other aircraft reacting? Do they know that I'm hurt? Which way is home? Do I have tanker support?

**Analyze the situation and take proper action.** This is not so easy anymore. Your immediate task may be to defeat an air-to-air missile or jink from AAA. Can you judge the extent of your problem with one eye on the caution panel and the other on the MiG? You may be so caught up with the fight that your first indication of a problem is an abnormal response to a flight-control input or adverse yaw.

Here's where your judgment comes into play. You must answer this question: How much is my performance degraded and what systems are affected? The extent to which you will be able to answer that depends on your general knowledge and, just as important, *your familiarity with past problems in the systems of your aircraft.* Why may a single generator failure in an F-15 be serious? Because at times in the past, it has been followed by a fire. Your type aircraft will have its own peculiar problems. Learn about them by reading all the mishap and hazard reports that apply to your community.

So, what should your first action be in a combat situation? **Disengage.** How? Think of a few situations and you will come up with some possible actions. You will need to do one or more of the following: Shoot a missile or the gun, drop a bomb, jettison tanks and/or ordnance, light the burners,

. . . Head for friendly territory. Read almost any account of an emergency in combat, and you will gather that heading for home was foremost in the minds of those afflicted . . .

drop chaff and flares, take it up, take it down, head for the clouds, point toward a safe area, etc. If you are defensive or neutral, your DCM skills will be tested.

Decide if you *can* get out of the mess on your own. Call for help/re-establish mutual support. If your wingie is there, be directive. Otherwise, get on the horn and see if you can get someone else on the way. Mutual support becomes paramount when a flight member is having a problem. Try to envision fighting your way out with an engine fire — *alone*! It's not a very pleasant scenario.

OK, now you are free from the immediate threat with your wingman in a supporting formation. What next?

**Head for friendly territory.** Read almost any account of an emergency in combat, and you will gather that heading for home (feet-wet in Southeast Asia) was foremost in the minds of the afflicted. The pain and loneliness of a POW camp was well-known by pilots, so the incentive was patently obvious.

Consider what battle damage might cause: flight control or structural anomalies, oil/fuel/hydraulic leaks, injury to the crew. In this case, you may have a limited amount of time in which the aircraft is flyable, so you *must* know which way to point.

**Land as soon as practical.** Yes, and maybe not from where you departed! In fact, how about that highway landing strip marked on your chart? Look closely at a map of Southeast Asia and you'll see a number of these.

Your ability to handle an emergency situation may be hampered by a number of other circumstances. You may not have free use of the radios; you may be alone ("My wingman split at the merge, and that's the last I saw of him."); you could be injured (some AAA are pretty accurate); you may be lost ("Those green hills/sand dunes all look the same to me.")! Think about how these would complicate your plan for a safe recovery.

There are many emergencies which would create special problems in combat: hydraulic failure, engine failure, structural damage, fuel leak, oil leak, bleed air light, etc. Even items that are briefed daily become totally different beasts when placed in the context of battle. Try using "Landing Immediately After Takeoff" given a configuration of three bags, eight missiles, a low ceiling and a runway that has just been cratered, as the emergency of the day sometime. That's one sure way to liven up your next briefing! ◄

*Adapted from Flying Safety, Dec 1984*

Lt. Constantino is an F-15 pilot with the 27th Tactical Fighter Squadron at Langley Air Force Base, Va. He is a graduate of Top Gun.

# Night VFR — Mutually Exclusive Terms

By Lcdr. P.H. Mills

IT was a starlit night in the East China Sea, just south of Korea. As I manned up, my normal night jitters abated as I looked at a definite horizon and at least one million stars. All I had to do was go overhead, take some fuel from the offgoing KA-6 tanker and assume the duties of mission tanker. The only real challenge seemed to be flying an "OK 3" to finish the night. Unfortunately, I was about to be introduced to one of the reasons the night tanker mission can be so challenging.

As I climbed out on the arc to 6,000 to rendezvous on the KA-6, I noticed two things which would gain my full attention later. First, there was a noticeable "milk bowl" effect that should be familiar to anyone who has flown in the Med or around the Korean coast. Secondly, the abundance of stars overhead was matched only by the lights on the fishing boats in the water that night — there were *thousands* of them!



Once level at Angels 6 overhead, I located the green "twirley" of the KA-6 and bent my Corsair around to set myself up on altitude with about 20 knots of closure. Once I had accomplished this, I simply put those lights in the crotch of my canopy rail (the A-7 rendezvous gouge) and held that picture.

Things seemed perfectly comfortable to me except for the fact that I was having a bit of trouble keeping my closure under control. Although the power kept coming back, the airspeed kept creeping up. Finally I began to notice an unsettling rush. Something was tellng me I was accelerating, but the throttle was back too far for that to be true.

At long last I decided to "glance back inside at the instruments" just to reassure myself. My first impression was that my platform (IMU) had dumped because I "knew" what the HUD was telling me — 60 degrees angle of bank and a 20-degree descent couldn't be true. Further investigation (ADI, VSI, airspeed indicator) told me that I either had a complete instrument failure — the "Korean Triangle" perhaps? — or that I was completely disoriented!

It's not as easy when you don't expect it. But flying basic instruments can still help you recover from unusual attitudes . . . once you've decided to look at your gauges! I rolled wings level, pulled on the stick and recovered at 3,000 feet — 3,000 feet low and 100 knots fast!

I verified beyond any doubt that night that when there is no visible horizon, putting the lead aircraft on the canopy rail and dropping your instrument scan just doesn't hack it. I had dropped my nose slightly as I set that "rendezvous light picture" and set up a slight rate of descent. As my altitude decreased, I had put in more angle of bank to keep the tanker on the canopy rail, killing more lift, etc. A typical death spiral.

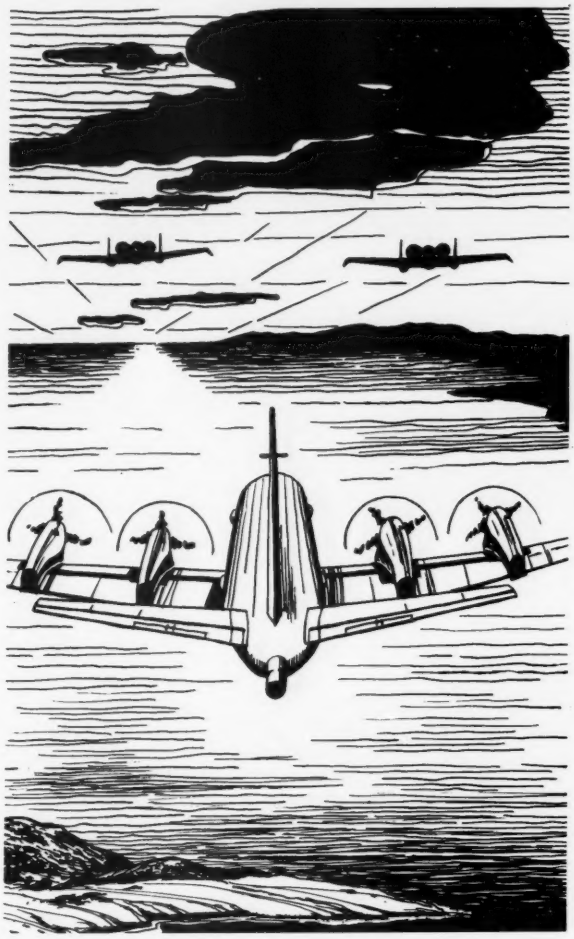
Since that night, I have verified many times that there is no such thing as a VFR-only scan at night. When the sun goes down, keep the instrument scan going. It's probably going to give you your first clue, if the horizon you see is the wrong one. ◄

Lcdr. Mills is with VA-27, an A-7 attack squadron based at NAS Lemoore, Calif.

## Those Aren't Seagulls . . .

# They're A-10s!

By Lt. W.A. Goss



THREE P-3C Orions were making their final VFR simulated mine drop of the day, at a mining range off the coast of South Carolina, which had been reserved for the squadron all afternoon. The three previous computer on-line runs had been uneventful, with the normal abundance of coastal bird activity. The last run of the day was to be a slightly more difficult simulated off-line drop.

The winter afternoon sun had started to sit lower on the horizon and this next off-line run was directly into it. Occasional seagulls had been successfully avoided throughout the previous runs. At our push time the lead P-3C descended to 300 feet, accelerated to 300 knots and commenced flight toward the initial point (IP) directly into the glare of the sun. The patrol plane commander (PPC) spotted two seagulls in the distance. They appeared a few hundred feet above them in their flight path. They would easily fly below and between them. The co-pilot, F/E and observer pilot all acknowledged the bird call and concurred that the birds would be "no factor."

Moments later, now at the start of the mine line and in the direct glare of the sun, the flight station again checked the position of the two seagulls. Again, "no factor," they wouldn't be flying any nearer to them than any other birds they had seen today at 300 feet and 300 knots. Seconds later, the birds appeared to grow shockingly in size and had really mastered picture perfect spread wing formation flight. As these particular "seagulls" instantly filled the field of view from the cockpit it dawned on the entire flight station . . . "Those aren't birds . . . they're A-10s!"

The two camouflaged A-10s were flying loose formation directly up the P-3s reserved practice mine line. The lead P-3 was now head-on but still obviously passing below and splitting the difference between the A-10s with less than one mile distance at a closing speed of approximately 600 knots. The PPC elected to maintain heading. Diversive action to the starboard or port would have put him into the flight path of an A-10 on either side. The P-3 passed directly between both A-10s and approximately 200 feet below them. The A-10 on the port side made a slight diversive turn to his starboard approximately three seconds prior to passing nearly on top of the P-3. The lead P-3 immediately passed a "heads up" to his closely spaced playmates who then easily avoided the A-10s by a safe distance.

LESSON LEARNED: A-10s really do look like seagulls when approaching them head-on. This illusion fooled three pilots and an F/E for an unsafe period of time (approximately 20 seconds). A-10s also like to fly very low along the coast just like seagulls. The only way to tell the difference head-on is that the green spread wing A-10 fills up your windscreen about a thousand times faster. A direct sun in your eyes doesn't help this illusion. Try to avoid flying the mining profile directly into the sun. Personally call military air commands in the vicinity of mining ranges and inform them that multiple P-3s will be flying a high speed/low altitude VFR profile along a specific track in *reserved* airspace. Also, the spacing you give birds is not the spacing to give airplanes. Near midairs are not filed on close approaches with seagulls. If there is any doubt as to the identity of an approaching UFO, *give it plenty of space.*

Finally, VFR is VFR, so keep your head out of the cockpit, avoid flying into the sun and stay out of the way of anything that looks like seagulls, no matter how good a bird dodger you might think you are, because your flock of seagulls might turn into a flight of A-10s before you can blink an eye. ◄

Lt. Goss is the aircraft division officer with VP-8, NAS Brunswick, Maine. He is presently deployed with VP-8 in Rota, Spain/Lajes, Azores. Lt. Goss, a graduate of Rutgers University, earned his wings in 1981, after two years of enlisted service in the Navy.

Ltjg. Dave Reichenberg
Ltjg. John Finley
VT-6

Lieutenant (junior grade) Dave Reichenberg, a VT-6 primary flight instructor, and his student, Coast Guard Ltjg. John Finley, took off in their T-34C for a familiarization flight. (It was Finley's second hop.) Approximately 30 minutes into the flight, the Turbomentor experienced fluctuating engine torque and a chip light showed in the cockpit. Reichenberg took control of the aircraft and initiated NATOPS procedures for a climb to high key for a precautionary emergency landing at OLF Summerdale. He noted that he was not obtaining normal climb performance from the aircraft. Once in position to glide to high key, Reichenberg attempted to reduce power to 250 ft lbs torque in accordance with NATOPS to establish his glide to intercept the emergency landing pattern. However, he was unable to reduce power below approximately 450 ft lbs and noted that prop rpm was decaying below 2,000, with the aircraft developing an excessively high sink rate.

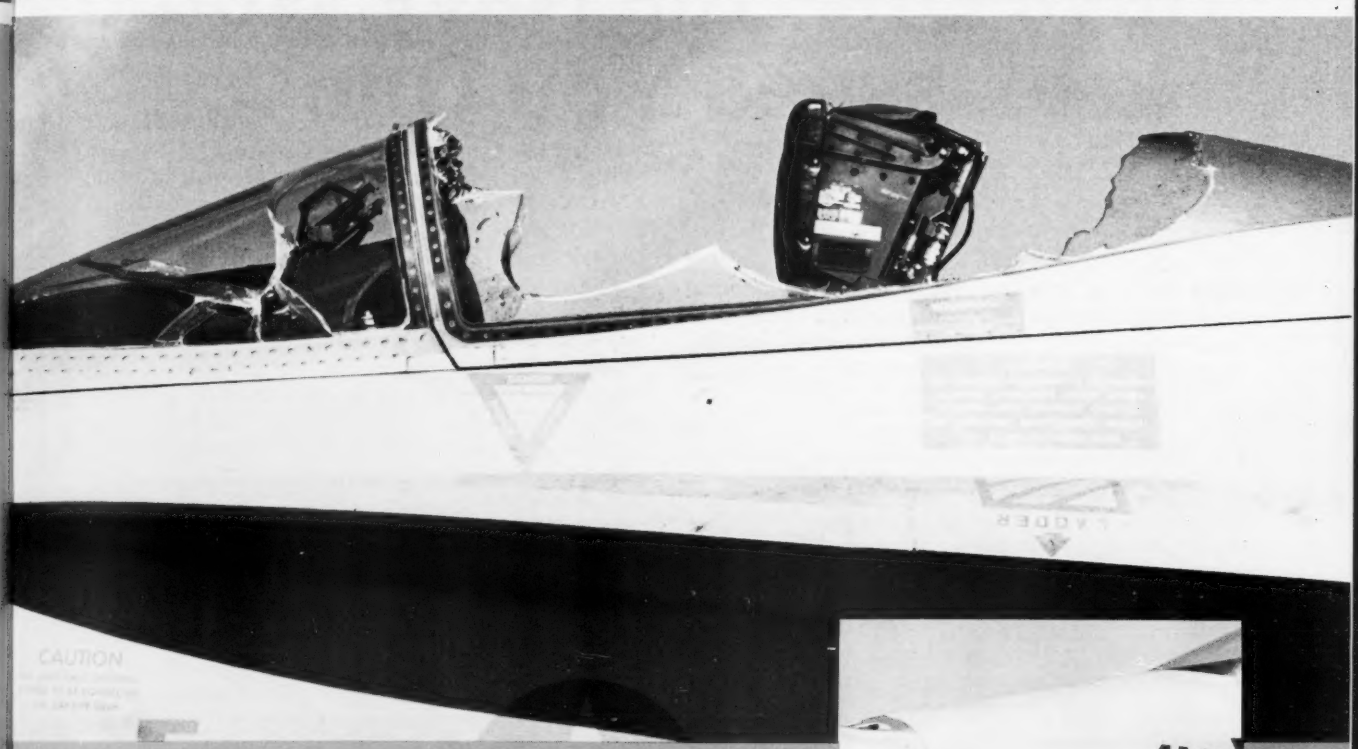
Judging that he would not make his high key position due to the degraded engine performance, Reichenberg elected to secure the engine and feather the prop in accordance with NATOPS. Intercepting the emergency landing pattern just below high key, he flew a dead stick approach to an uneventful touchdown.

Assisted throughout the emergency by Finley, who coolly performed cockpit tasks assigned by his IP, Reichenberg was able to avert a potentially dangerous emergency and save a valuable aircraft.



Ltjg. Dave Reichenberg (left),
Ltjg. John Finley (right)

# BRAVO ZULU



Maj. R.C. Chisum, USMC
Capt. Rick Dale, USMC
VMFA-314

Major Chisum and Capt. Dale were flying a low level navigation mission en route from MCAS Beaufort, S.C. to NAS Pensacola, Fla. Thirty-five minutes after launch, at 600 feet AGL and 420 KCAS, Dale's F/A-18A struck a bird which impacted in the top center portion of the windscreen. Dale was looking right, at his 3 o'clock position and jerked his head forward on impact. His oxygen mask disconnected, the bayonet fitting bending to the extent that it could not be reconnected. Two-thirds of the visor broke off, and the remaining portion was ineffective.

Dale immediately climbed to 5,000 feet, slowed to 240 KCAS and informed Chisum, the lead, of the birdstrike. Chisum initiated a turn to NAS Cecil, the nearest divert field. As Chisum called Cecil, Dale lowered his seat to reduce the wind blast and to better hear his radios. Chisum's coordination of this portion of the incident was extremely effective and timely as Dale concentrated on flying his damaged Hornet, the excessive wind blast and damaged oygen mask fitting making radio communication difficult.

Dale transitioned to the dirty configuration at about six miles from Cecil, confirming the landing checklist over the radio with Chisum. In spite of partially impaired vision, Dale flew a straight-in approach to a successful roll-in arrestment. ◄


Maj. M.C. Chisum (left),
Capt. Rick Dale (right).

# "If the Navy Wanted You to Have One, the Navy Would Have Issued You One . . ."

By Lcdr. Andrew J. Peck

. . . Outside of the military, there is a wealth of very valuable information available from other government and private sources. Those additional publications offer guidance which will enable you to be a safer and more efficient pilot . . .


"IF the Navy wanted you to have one, the Navy would have issued you one!" Would everyone who's been told that at least once please raise your hands? Wow, that's just about all of you. OK, hands down.

The underlying concept, you no doubt realized, is that the Navy will provide you with everything necessary to accomplish your mission safely and efficiently. Navy training *will* teach the minimum necessary to be a flight crew member. However, to "be all that you can be," you'll need to explore beyond what the Navy gives us. Most of our advanced and recurrent training seems to be oriented toward tactical missions and aircraft systems.

From my observations, this is often to the exclusion of more general pilot-related training and education. Outside of the military, there is a wealth of very valuable information available from other government and private sources. Those additional publications offer guidance which will enable you to be a safer and more efficient pilot.

When I was on active duty, I did not seriously explore nonmilitary avenues for improving my professional knowledge in hindsight, it is frightening to realize how blissfully ignorant I was then. I have found that in flying, as in many other endeavors, the more that we learn, the more we become aware of the limits of our knowledge. Education can be a humbling experience. I am now a civilian airline captain with 6,000 pilot hours (2,200 military). My pilot certificate needs two pages to list my ratings, and my instructor certificates use two more pages. However, as I gain more experience and knowledge, I spend increasingly *more* time studying professional publications because I realize that there is so much more to learn. The purpose of writing this article is to share with you some of the sources I have used to become more proficient as a pilot. We should all want to become more proficient. After all, isn't that why you put

down that skin magazine long enough to read Approach? (Yeah, I know that *you* didn't buy it. You found it on the floor in the line shack, right?) These sources contain information which I wish I had known when I was a first-tour fleet pilot flying H-2s. Here's a rundown on some of them.

**Government Pubs.** Some of the best information is also the cheapest. FAA produces some outstanding publications for pilots, most of which are free. They are available by mail or in Government Printing Office bookstores located in major cities. Others are available at the FAA's many airport offices as part of their very active safety program. They are of value whether you're in the front seat of a T-34 or you're a third-tour pilot in a P-3, H-2 or F-18.

The *Guide to Federal Aviation Administration Publications* is just what its title indicates — an introductory handbook. It is curiously lacking in government double talk. (When was the last time you understood anything published by the IRS?) It describes the types of publications which are available, with brief descriptions of representative ones. It also explains where and how to order them. To receive a copy, just call the nearest FAA office and ask for one. While you're at it, ask for a copy of AC 00-2, the Advisory Circular Checklist. If these are not in stock or you have no office nearby, contact the FAA Public Inquiry Center, APA-430, 800 Independence Ave., SW, Washington, D.C. 20591 or call (202) 426-8058/8059.

While the Guide to FAA Pubs describes the breadth of the publications available, those of most interest to us lie in two areas: Advisory Circulars and flight safety materials. Most of these are free. The remainder are very reasonably priced. Advisory Circulars, as their title implies, are informative in nature. However, some are actually *de facto* regulations because they explain what is required to comply with the FAA's or to keep the Feds smiling. If you're acquainted with the Navy directive numbering system, the ACs will seem familiar. The first number represents the subject area. The one following the hyphen is the serial number within that subject area. The first revision of that AC has an "A" suffix, the second has "B," etc.

Basically, ACs come in two flavors: freebies and ones for sale. The former are relatively thin — usually under 20 pages, while the latter are soft-cover books. Here's a sampling of the freebies you may find interesting:

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| 00-30 | *Rules of Thumb for Avoiding or Minimizing Encounters with Clean Air Turbulence* |
| 00-46B | *Aviation Safety Reporting System* |
| 00-50A | *Low-Level Wind Shear* (Remember the Pan Am crash at New Orleans?) |
| 60-40A | *Pilot's Spatial Disorientation* |
| 90-1A | *Civil Use of U.S. Government Approach Charts* (To the best of my knowledge, this is the only comprehensive guide available to us which explains the NOS approach plates used by the military. Most civilian pilots use charts published by a commercial source.) |
| 90-23 | *Aircraft Wake Turbulence* (Don't think that this applies only to T-34s, you P-3 jockeys. I recently witnessed a C-141 putting on an impressive aerobatic demonstration as he encountered his buddy's wake turbulence after a reduced-interval takeoff.) |
| 90-70 | *Straight-In Non-Precision Instrument Approach Procedures Visual Descent Point (VDP)* |
| 91-6A | *Water, Slush and Snow on the Runway* |
| 91-24 | *Aircraft Hydroplaning or Aquaplaning on Wet Runways* |
| 91-25A | *Loss of Visual Cues During Low-Visibility Landings* (Lt. Bracey published a good article on this subject in the Nov Approach.) |
| 91-32A | *Safety In and Around Helicopters* |
| 97-1 | *Runway Visual Range (RVR)* |
| 120-5 | *High-Altitude Operations in Areas of Turbulence* |
| 120-35A | *Line-Oriented Flight Training* (This is the "hot thing" for airline simulator training. I think the Navy would do well to emulate it. Perhaps some squadron NATOPS officer will "pick up the ball and run with it" after reading this AC.) |
| 150/5200-18 | *Airport Safety Self-Inspection* (Could be of interest if you're a ground safety or base operations type.) |

Part of the FAA's very active accident prevention program is the distribution of flight standards safety pamphlets. These bright yellow publications are available at local FAA offices and at some flight service stations (the folks who talk to you on 255.4 MHz). The pamphlets are brief (usually fewer than 10 pages) and deal with basics. One of them, "Always Leave Yourself an Out," cannot be recommended too strongly if you're flying a machine with multiple motors. Some of the concepts also apply to "rotorheads." A reprint of a typically outstanding article from "Business and Commerical Aviation," this pamphlet picks up where other books, including NATOPS, leave off. It has an excellent discussion of takeoff and climb techniques which will optimize one's position in the event of an engine failure.

Nearly every training book discusses climb profiles following cessation of engine power, but these same books (including our beloved NATOPS manuals) are strangely silent on the subject of transitioning from $V_{50}$ (target speed at 50 feet AGL) to en route climb speed with all motors operating normally. The only exception I have found is the FAA's Flight Training Handbook, AC 61-21A. I have been horrified by the techniques I've seen some people use to effect this transition. An incident report released about three years ago involved a P-3 driver making a night takeoff. He devoted more attention to accelerating than climbing and almost cashed in the crew's insurance policies.

Anyway, returning to the pamphlets — there are 40 available. Here are some of the more interesting ones:

Some Hard Facts About Soft Landings
Descent to the MDA and Beyond
Flying Light Twins Safely
Always Leave Yourself an Out
Anatomy of a Landing — Cue by Cue
Wind Shear

Continued

I dug into my professional library and picked out some of the more interesting ACs which the government has sold to me. They include:

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| 00-6A | ($8.50) *Aviation Weather.* More understandable and current, but less comprehensive than "Meteorology for Naval Aviators." Written for pilots (lots of pictures). |
| 00-45B | ($6.00) *Aviation Weather Services.* Basically, AC 00-6A reveals how God makes the weather. This AC tells you how the National Weather Service and the FAA report it to you. |
| 60-14 | ($6.00) *Aviation Instructor's Handbook.* A concise guide to the learning process and effective teaching techniques. It is generic in that it deals with concepts of instruction, rather than how to teach specific maneuvers. |
| 61-13 | ($5.50) *Basic Helicopter Handbook.* If you prefer having your source of lift directly overhead where it is most useful (remember, I'm a former rotorhead), then this will be a valuable review of what you learned at NAS Whiting (or at NAS Ellyson, if you're an old salt like me). |
| 61-21A | ($9.00) *Flight Training Handbook.* An exceptionally well-written comprehensive guide to the performance and analysis of basic and advanced VFR flight maneuvers, excluding aerobatics. Written for both pilots and instructors, it also has a concise section on the aerodynamic theory involved in performing the maneuvers described in the manual. |
| 61-27C | ($8.50) *Instrument Flying Handbook.* Similar to the NATOPS Instrument Flight Manual in subject matter, it devotes more time to the technical details of the flight and navigation instruments, but omits military-related items (e.g., flying ACLS approaches). It also contains a copy of AC 90-1A. |
| 61-54 through 61-62 | ($1.75-$4.50) *Flight Test Guides.* These guides tell you what to expect on a checkride for an FAA pilot or instructor rating. |
| FAA-T-8080-1 through -8 | ($4.25-$8.00) *Question Book.* The FAA now publishes nearly all of their written exams, so you can look at the test in advance. "FA-A-AR OUT!" you say. The catch is that there are 600-1,000 questions in each book and you don't know which 40 to 80 of them will be assigned until the "big day." Still, it's a helpful study guide. |
| 91.11-1 | ($5.50) *Guide to Drug Hazards in Aviation Medicine.* A valuable reference book, but it did not impress me as being written for pilots (uses too many big words). |

While this doesn't aply to aviating, per se, if you have an infant safety seat for your offspring and would like to use it on airliners, request a copy of TSO C1000 from the FAA by calling (202) 426-8374. This Technical Specifications Order lists all of the seats currently approved for aircraft use. My suggestion is to carry a copy when you travel. Most airlines, including the one for which I fly, have done a poor job of informing their employees which models of seats are acceptable.

A publication which was free until a few years ago (it now costs $20) is the collection of VFR and IFR "Exam-O-Grams." They are described by the FAA as containing "analyses and explanations of aeronautical misconceptions revealed in written pilot tests and accident and violation reports." My set is an old (free) one. A few of the subjects covered are:

Common Misconceptions
Altimetry
Potential Midair Collisions
VFR Operations on an Instrument Flight Plan (VFR on top)
The Radar Summary Chart
Rate of Turn
Runway Marking

**Commercial Books.** In addition to the publications produced by the Feds, the commercial sector offers a number of useful books. Not surprisingly, these aren't free. I dug through the non-FAA side of my professional library and came up with a list of books which I feel have been of the greatest value in my professional development. I have included the names of the author and publisher to facilitate ordering. I obtained my books from aviation sources, but there is no reason that your corner bookstore couldn't procure them for you. Other sources for these books include FBOs (fixed-base operators) at your local airport, advertisements in civilian aviation magazines, Sporty's Pilot Shop (Clermont Airport, Batavia, Ohio 45103, or call (800) LIF-TOFF) and the Aviator Store (7201 Perimeter Road South, Boeing Field, Seattle, Wash. 98108, or call (206) 763-0666). Usually cheaper than Sporty's, but with a limited selection, is Aircraft Components, Inc. (700 North Shore Drive, P.O. Box 1188, Benton Harbor, Mich. 49022, or call (800) 253-0800. Call (616) 925-8861 if you're in Michigan.). Here they are:

1) First and foremost is *Aerodynamics for Naval Aviators*, by H.H. Hurt, Jr., no publisher listed. In my opinion, a copy of this should be issued to every aviator along with his flight jacket and sunglasses. It is a technical publication, but still understandable — even to us business majors.

2) The Flight Instructor's Manual, by William K. Kershner, Iowa State University Press. This book covers a broader range of subjects than the FAA's Flight Training Handbook, albeit in less detail. It is intended to be more of a "single source" for flight instructors than the FAA book, which is designed to be used with other publications. As its title indicates, it is written directly to the instructor, while the F.T.H. is written to both the instructor and the pilot. This would be an excellent choice if you're a Navy instructor or are planning to earn a civilian flight instructor certificate.

3) *High Performance IFR Flying*, by Allen Schwab, Queensmith Communications, Inc., West Building, Washington National Airport, Washington, D.C. 20001. This is a 60-page book of "nuts and bolts" gouge on flying multi-piloted turbine aircraft. The author is a civilian airline pilot whose background includes being both an Air Force and civilian flight instructor. He assumes that the reader is well-versed in the basics and is looking only to "tweak and peak" his IFR abilities. A well-written book!

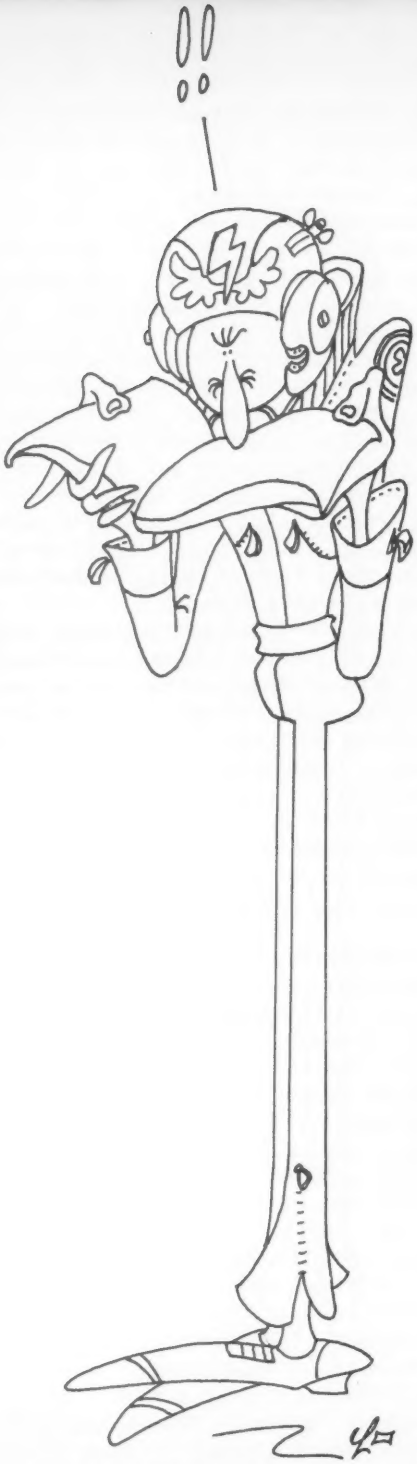
4) *Weather Flying*, by Robert N. Buck, Delacorte Press. The author is a retired TWA captain who has made more Atlantic crossings than most Approach readers have flight hours. The book does *not* begin with "The atmosphere is 78 percent nitrogen, 21 percent oxygen . . ." like all too many meteorology books. With a minimum of theory, it seems to be written for the knowledgeable pilot who has already spent some time in the clouds. It talks about how to fly weather and how to avoid the bad stuff. Captain Buck draws on his zillion-plus hours of airline flying, his hobby of glider flying and his experience while conducting icing research in the Aleutians (West Coast P-3 drivers should find that interesting). I try to read it at least once a year.

5) *Flying Know-How*, by Robert N. Buck, Delacorte Press. Like *Weather Flying*, this is not an "introduction to basics" book. The book primarily deals with attitudes, philosophies and tricks of the trade for being a truly professional pilot. Also, like Weather Flying, it is very readable.

6) *Thunderstorms and Airplanes*, by Richard L. Collins, Delacorte Press. Mr. Collins is the editor of Flying magazine and a prolific writer. This is one of very few books about thunderstorms written for pilots. The author discusses how thunderstorms develop, how they are forecast and how they destroy airplanes. A large number of representative mishaps are reviewed. The single most important item I've learned from this book is that very few airplanes are actually destroyed by thunderstorms. Most thunderstorm-related mishaps occur when the airplane is upset and the pilot does a poor job of recovering from the resulting unusual attitude. When was the last time you practiced that?

7) *Severe Weather Flying*, by Dennis Newton, McGraw-Hill. This is the only other good book about thunderstorms which I have found. I consider it to be a complement to *Thunderstorms and Airplanes*, rather than a substitute for it. The text deals less with analyzing aircraft mishaps and more with understanding thunderstorms and the hazard they present to flying machines. The author's credentials are impeccable and include a stint as a thunderstorm research pilot. He depends on the use of several heuristic models to guide the reader through the development and makeup of the various types of storms. He gives very specific guidance on how to avoid and, if necessary, cope with them. It's easy to say, "Don't fly when thunderstorms are forecast." However, that would mean not flying for half of the year in some parts of the country. Do you really think CAG will cancel the Alpha Strike because the Kamchatka Peninsula is in Thunderstorm Condition II? The last one-third of the book is devoted to icing, the other form of severe weather which can cause airplanes to "land" prematurely. The readability of this book is extremely good.

8) *Instrument Flying*, by Richard L. Taylor, Macmillan Publishing Co., Inc. The author is an associate professor in the Department of Aviation of a state university. The book seems to be written primarily for the new instrument pilot,



. . . I have found that in flying, the more we learn, the more we become aware of the limits of our knowledge. Education can be a humbling experience. I spend increasingly *more* time studying professional publications because I rationalize that there is so much more to learn . . .

although certainly there is information of value to everyone. It is basically an applications manual for the instrument rating and tells how to efficiently use the skills and knowledge necessary for that rating. I found one minor error in the book and several of his suggested techniques are not the most efficient way to "skin a cat," but they do work. In the balance, though, the book is a worthwhile one, especially if your wings are still relatively shiny.

9) *Stick and Rudder*, by Wolfgang Langewiesche, McGraw-Hill. This is subtitled "An Explanation of the Art of Flying." This book was originally copyrighted in 1944 and is considered a classic. Like some translations of the Bible, the wording is a bit awkward but there's a strong and very valuable message if you dig a bit. The author was an advocate of the angle-of-attack method of controlling aircraft long before the Navy was equipping its planes with AOA indicators. The Navy flying club at which I once instructed made the "Landing" chapter required reading for a checkout in tailwheel-type aircraft.

10) *The Flying Mystique*, by Harry Bauer, Delacorte Press. Mr. Bauer examines flying from a philosophical point of view. He states, "Flying combines the technical and holistic aspects of life. It forces us to put together many parts of our lives that didn't seem related before." This book, along with a videotape of the "Sex and the Naval Aviator" safety lecture, may help to explain why we're attracted to this crazy business. Even so, I've still not determined why I'd rather be a pilot than have a "real job" with regular hours and no RONs.



11) *Rotary Wing Aerodynamics*, by W.Z. Stepniewski and C.N. Keys, publisher unknown. Here's one especially for you "unrestricted pilots" who aren't limited to flying only stiff-winged machines. It's not in my library, so I can't comment on it. I saw it listed in a supplement to a catalog from Dover Publications, Inc., 31 East 2nd Street, Mineola, N.Y. 11501. The price for this 640-page manual was unfortunately omitted. Based on their very reasonable prices for other books, I would estimate $10.

12) *There I Was . . . Flat on My Back*, by Bob Stevens, Aero Publishers, Inc., 329 West Aviation Road, Fallbrook, Calif. 92028. This book probably will not improve your professional abilities, but it sure is funny. It is a collection of great cartoons, ballads and poems from military pilots in the last three wars. My squadron's flight engineer NATOPS evaluator uses cartoons from this book to spice up the monthly Safety/NATOPS mailings to crew members.

13) *Airman's Information Manual.* If you're thoroughly conversant with this publication, you're a step ahead of most of your peers. It is like an expanded FLIP General Planning. Rather than paying megabucks for the government's edition, several commercial sources produce versions of it under this title. They usually add supplements, such as digests of the FARs, the Pilot-Controller Glossary or Flight Test Guides. Contact Sporty's, the Aviator Store, Aircraft Components or an FBO at your local airport for details. Expect to pay about $6 to $9 for a copy.

. . . The Navy has not provided *all* the information necessary to become a truly knowledgeable and proficient pilot — and thus a safe one. It is not reasonable to expect the Navy to do so since that would be wasting tax money to duplicate information which is already available . . .

14) *Low-Altitude Wind Shear and Its Hazard to Aviation*, by the Committee on Low-Altitude Wind Shear . . ., National Academy Press, 2101 Constitution Avenue NW, Washington, D.C. 20418. I just received this publication and have not finished reading it. Following the Pan Am wind shear mishap at New Orleans, Congress directed the FAA to contract with the National Academy of Sciences "to study the state of knowledge, alternative approaches and the consequences of wind-shear alert and severe weather condition standards relating to takeoff and landing clearances for commercial and general aviation aircraft." This comprehensive and valuable report on the committee's findings can be yours by mailing a check for $12.50 to the above address.

**Periodicals.** 1) *Aviation Week and Space Technology.* I have heard intelligence officers freely admit to using AW & ST as a source for their briefs. Sometimes referred to as "Aviation Leak," its credibility is excellent. It deals with aerospace technology, airline operation and aviation-related developments in the defense industry, as well as important aviation and military news stories. AW & ST also publishes reports from NTSB investigations of major aircraft mishaps. Military officers are entitled to receive the "qualified" rate, currently $45 per year. Send requests to Fulfillment Manager, Aviation Week and Space Technology, P.O. Box 1022, Manasquan, N.J. 08736.

2) *Business and Commercial Aviation.* An absolutely top-notch magazine for the professional pilot. I have yet to receive an issue which did not have at least one article worth saving for my professional library. The magazine is targeted primarily at corporate and regional airline pilots. Those individuals and their managers are "qualified" subscribers. If you can convince the circulation department that you also are, the subscription is a freebie. Otherwise, its $30 per year. Write to B/CA, P.O. Box 5850, Cherry Hill, N.J. 08034.

3) *Professional Pilot.* This magazine has tended to be a "People" or "Forbes" of corporate aviation, although there has recently been a pronounced shift toward more technical-type articles. Pro Pilot recently published an excellent article on flight crew fatigue and crew rest (as a P-3 driver, that "hit pretty close to home" for me). Subscriptions are handled in a manner similar to B/CA. Write to Professional Pilot Magazine, Queensmith Communications Corp., West Building, Washington National Airport, Washington, D.C. 20001.

4) *Flight Crew.* This is a quarterly magazine which bills itself as the "International Safety Journal for Corporate/

Commuter Aviation." It is a first-rate publication, in my opinion. It is also expensive for a 30-to-40 page magazine ($22 per year). However, very few of those pages contain advertising. The remaining ones have some top-notch articles. Here's a sampler of the 13 articles in the summer issue: Static, Ram and Total Air Temperatures; Aircraft Lightning Strikes; Checklists and the Human Factor; Runway Performance Monitors; and More Than You Ever Wanted to Know About Your Pressure Altimeters. Among the associate editors are Robert Buck, mentioned previously in this article. The Editorial Committee includes Scott Crossfield, a former Navy X-15 pilot and possessor of copious quantities of the "Right Stuff." If you're interested, write to Flight Crew, AvData, Inc., Harry Adams, Box 2398, Wichita, Kan. 67201, or call (316) 262-1491.

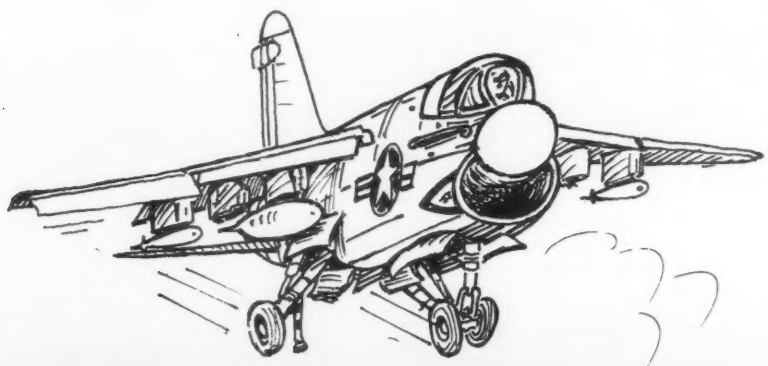
The above list of periodicals is certainly not exhaustive. I included only those publications of which a typical naval aviator might not be aware. Of course, Flying magazine, usually available at your local Navy Exchange or base library, contains a wealth of valuable information. If you plan to do any light plane flying, I would encourage you to begin reading Private Pilot and Plane and Pilot. If you've taken the FAA's Military Competency exam and have a civilian pilot certificate, you've no doubt received an offer to join AOPA, the Aircraft Owners and Pilots Association. I strongly encourage you to become a member. A subscription to their monthly magazine, the AOPA Pilot, and the monthly newsletter is included with membership. They alone justify the cost of the $28.50 annual dues. The AOPA also devotes a significant portion of its resources to monitoring the FAA's actions. Whether you realize it or not, military pilots have benefited significantly from the efforts of AOPA and the AOPA Air Safety Foundation. If you're interested, call (301) 695-2000 or write AOPA, 421 Aviation Way, Frederick, Md. 21701.

**Weather Briefings.** It is my considered opinion that Navy weather briefers do a pretty darned good job. Together with OPARS (the Navy's system for computer-generated flight routing), they are perfectly adequate for most flights. However, I fly in a part of the U.S. where the weather is anything but boring and predictable. In my never-ending quest for means to keep non-rubber parts of my airplane from contacting the ground, I have found that it is worthwhile to supplement the Navy's (and my airline's) briefs with additional "big picture" information. In addition to the local television station weather reports, the Cable News Network offers hourly weather updates during the times when news is broadcast. Some cable companies carry the Weather Channel, which is a 24-hour continuous weather show. Aviation weather appears hourly. At the "top of the heap," though, is A.M. Weather, which is sponsored largely by the FAA and the AOPA Air Safety Foundation. It is a 15-minute weekday show aired on most PBS stations. Genuine NOAA meteorologists do the briefings which are concise and excellent. The show usually appears before 0800. Call your local PBS station for information or borrow a civilian pilot's Jeppesen "J-Aid" — the schedules are in the meteorology section.

**Nearly the end** (sigh!). In summary, I have found that the Navy has not provided *all* the information necessary to become a truly knowledgeable and proficient pilot — and thus a safe one. It is not reasonable to expect the Navy to do so, since that would be wasting my tax money to duplicate information which is already available. However, I am disappointed that the availability of information from civilian sources seems to be considered a "military secret." The naval aviator who wishes to use those other resources will therefore have to take the initiative in pursuing them. Your efforts will be rewarded. If you itemize deductions on your income tax return, their cost should be deductible under "miscellaneous deductions" as professional publications.

Now that you've been made aware of all these resources, you can no longer live in blissful ignorance. Who was it who said, "If ignorance isn't bliss, then I don't know what is?" Happy reading! ◄

Lcdr. Peck is a P-3 plane commander in the reserves and an F-27 captain for Horizon Air after seven years of active duty flying helicopters and C-1s. In addition to an ATP and five type ratings, he is a certified flight instructor with single- and multi-engine land and instrument ratings. He holds advanced and instrument ground instructor licenses and a commercial certificate for single-engine land aircraft and helicopters.



# "Cable, Cable, Where is the Cable?"

By Lcdr. C.P. Langford

THE A-7 was on a parts run to Midwest Muni, an Air National Guard base, when the pilot felt several spurious yaw inputs. He continued toward his destination. As he rolled out on final, an uncommanded yaw and roll occurred. While regaining control, the pilot allowed the nose to drop and failed to reduce the power, causing the aircraft to accelerate and overfly the intended point of landing. The pilot continued the landing rather than go around with a questionable yaw stabilization system. The power was reduced to idle and the aircraft was forced onto the runway approximately 3,000 feet from the approach end.

Heavy breaking was attempted with minimal effect. The pilot kept the aircraft on the runway, lowered the tailhook and set the aircraft attitude for a long-field arrestment. The aircraft failed to engage either the long-field or abort gear and departed the runway at 90 to 100 knots. The aircraft sustained extensive damage to the landing gear and engine when it crossed a drainage ditch. The pilot was not injured.

This mishap confirmed some old lessons about landings: Don't land long, don't land fast, know when to take it around, don't turn a minor malfunction into a mishap, etc. The mishap also teaches a new lesson on arresting gear capabilities. At the airfield involved in this mishap, the BAK-14 cable support system was installed in conjunction with the BAK-12 arresting gear and was a contributing factor in the mishap.

The BAK-14 cable support system allows a conventional

arresting gear cable to be stowed in a slot in the runway allowing a clear runway for takeoffs and landings by light aircraft and low-slung tactical fighters like the F-16. The cable rests on rubber supports which are raised with pneumatic pressure by remote control from the tower. This is much better than having the cable derigged to clear the runway, but it calls for a degree of caution. The system may take up to 7.5 seconds to fully raise the cable for a successful arrestment. This equals 1,875 feet if you're in an aircraft rolling down the runway at 150 knots on a takeoff abort, requiring an early call to tower in an emergency.

The Flip IFR supplement lists the presence and location of BAK-14 systems in two places in the aerodome remarks: the runway data section and the arresting gear remarks. In the runway data section, the BAK-14 will be listed as part of the installed cable system, i.e., BAK-12/14, BAK-9/14, etc. More frequently, however, the presence of the BAK-14 system will only be indicated in the arresting gear remarks by a comment like "BAK-12 cable raised by BAK-14 on request to tower." The presence of a BAK-14 device will not be listed in the approach plates.

The following procedures should be followed to avoid surprises with the BAK-14 system:

1. Thoroughly review Flip Publications prior to flight. References to the BAK-14 device are obscure unless you are looking for them.

2. If practicable, request the long-field cable be raised prior to commencing takeoff roll or landing. This will prevent any delays in raising the cable in an emergency, particularly if you are on an approach or departure control frequency. Of course, if you plan a short-field arrestment, advise the tower prior to landing.

3. If the long-field gear is needed during landing rollout or takeoff abort, transmit "Cable, cable, cable" on tower at least 2,000 feet prior to the cable.

Below is a list of U.S. airfields using the BAK-14 system. Note that some of our favorite gas stops, Tinker Air Force Base, Tulsa International and Albuquerque are on the list. For squadrons deploying overseas, additional information is available in a publication entitled, "World Wide Aircraft Arresting System Summary," published by the Defense Mapping Agency. ◄

Lcdr. Langford is the aviation safety officer with VAQ-34.



| | |
|---|---|
| Albuquerque Intl, N.M. | Rwy 35 |
| Atlantic City, N.J. | Rwy 13/51 |
| Boise Air Terminal, Idaho | Rwy 10R/28L |
| Fort Smith Muni, Ariz. | Rwy 7/25 |
| Fort Wayne Muni, Ind. (Baer Field) | Rwy 4/22 |
| Gulfport Biloxi Regional | Rwy 13/31 |
| Hector Field, N.D. | Rwy 17/35 |
| Hickam Air Force Base/Honolulu Intl, Hawaii | Rwy 04R, Rwy 26L |
| Hulman Regional, Ind. | Rwy 05/23 |
| Jacksonville Intl, Fla. | Rwy 07/25 |
| Joe Foss Field, S.D. | Rwy 03/21 |
| Kingsley Field, Klamath Falls, Ore. | Rwy 14/32 |
| MacDill Air Force Base, Fla. | Rwy 22 |
| Nellis Air Force Base, Nev. | Rwy 03L/21R |
| Niagara Falls Intl, N.Y. | Rwy 10L/28R |
| Portland Intl, Ore. | Rwy 10R/28L |
| Savannah Intl, Ga. | Rwy 9/27 |
| Sioux City Muni, Iowa | Rwy 13/31 |
| Springfield-Beckley Muni | Rwy 6/24 |
| Standiford Field, Ky. | Rwy 01/19 |
| Tinker Air Force Base, Okla. | Rwy 17 |
| Toledo Express, Ohio | Rwy 25 |
| Tucson Intl, Ariz. | Rwy 11L |
| Tulsa Intl, Okla. | Rwy 17L08/26 |
| Wright-Patterson Air Force Base, Ohio | Rwy 23R |

# LETTERS

## Re: Three Engine Landing (Nov '84)

*Brunswick, Maine* — Unbelievable! Lcdr. James J. Miller, in his letter in the April 1985 Approach, seems to use "the book" to back up what is mistakenly used by the fleet, because it is taught by the VP RAG without tempering it with common sense, good judgment and a closer look at the same diagram (figure 3-15) in our NATOPS, as he uses to condemn Lt. Dan Duffy.

The difference between ground idle and max reverse is almost negligible — a lot more noise but no more reverse thrust. Use of max reverse *is* taught to demonstrate the capabilities of the aircraft but is on *very few* occasions required. The vast majority of our landings in the VP community leave us with *at least* 6,000 feet of runway remaining. My winter experiences in both Brunswick and Keflavik have proven time and again that ground idle is more than sufficient to stop the P-3 on wet and even icy runways.

Miller's statement "that's contrary to standard P-3 operations" is incorrect. That is not standard in the entire VP community. Additionally, just because something is "SOP" doesn't make it correct. The two engine out ditching drill at 200 feet used to be "SOP" until we lost an aircraft and crew 12 years ago.

In recent months I have read *many* messages on runway control incidents in the VP community. The pilots have learned a tremendous amount from "I've been there" type admissions. To discourage admission of errors or hammer the individual involved would result in lack of communications and dissemination of valuable information to all fleet squadrons. Duffy's flight station may have made some serious errors, but since "Three Engine Landing" appeared in Nov '84, all pilots in the fleet now have a larger data base from which to draw. Letters such as Miller's will restrict the flow of "I've been there" articles such as Duffy's, which are so critical to fleet safety.

Lt. J.B. Hollyer
Aviation Safety Officer
Patrol Squadron TEN

## Re: There We Were at 20,000 Feet . . . (Apr '85)

*Keflavik, Iceland* — Lcdr. Harmon brought to light a couple of misnomers that have been "bugging" the VP community for a long time.

• Never assume, when at altitude, that shutting down an engine for loiter will save gas. If the charts were consulted, you'd note that at 17,500 you would save only 40 to 60 pounds of gas per hour — not worth the headache of trying to stay ahead of the power curve. Your manuevering would eat up what ever is saved with the power additions to stay ahead of the curve. Climbing as he did only worsened a bad situation.

• Unfeathering engines at altitude, 20,000 feet at loiter airspeed, gives a negative torque sensing (NTS). Which is well below the 45-degree blade angle where the NTS inop light will illuminate. The NTS inop system was operating as advertised.

When Harmon was "400 miles out" and the chips light on No. 3 illuminated, he could have restarted No. 1 if his altitude and air speed had been within the envelope. Although he would have still been in an emergency situation, the emergency would have not seemed as extreme.

Cdr. H.R. Freeman
Air Operations
U.S. Naval Station, Keflavik

## Re: A Matter of Due Regard (Apr '85)

*Barbers Point, Hawaii* — I was very happy to see that you published my submission. I am greatly concerned however, about some of the subtle changes that you have incorporated. Specifically, the four requirements for "Due Regard" or "Operational" should have been proceeded by words to the effect; "subject to one or more of the following conditions." Furthermore, the omission of "; or " after each of the stated conditions makes it appear erroneously that all of the conditions must be met in order to be "Due Regard" or "Operational."

I submitted this article because of the confusion among many pilots of the concept. Your deletion of those necessary words has now made the article inaccurate and the concept even more confusing.

Lcdr. M.F. Spence
VQ-3 Safety/NATOPS Officer

## Re: "Air Breaks" (May '85)

*Philadelphia, Pa.* — May 1985 Approach (Vol. 30 No. 10) "Air Breaks" column contains an account of an A-7 that impacted the water shortly after a catapult launch. After reading the narrative, it becomes obvious to me that the author (a) has never been a Catapult Officer and (b) has not read the mishap closeout message which names the pilot's violation of NATOPS as the proximate cause of the mishap and absolves the Catapult Officers of any culpability. A retraction is in order.

(Name Witheld)

**• We received four letters and a phone call, all from members of the ship involved, regarding that Airbreak. The letter above is representative of the theme and tone of the others.**

**That Airbreak contains the mishap scenario as reported in available message traffic and, clearly separated in italics, our own editorial comments. The names, dates and places are deleted. The thrust of that item is to increase the awareness of everyone, on every flight deck, about what they could do to prevent this sort of thing from happening again. We lost a valuable machine and almost had a shipmate killed. We at Approach prefer to concentrate on that sobering fact rather than whose six was covered and whose was not. The same message referenced in the letter above also states in the recommended corrective actions section; "Ensure catapult officers insist on and observe a proper salute before committing an A/C to launch." All concerned should read the recommendations section of every MIR and endorsement as carefully as they read the "who done it." — Ed.**

## Re: The Morning After (May '85)

*NAS Norfolk, Va.* — Lcdr. Miles' article covers, in detail, the sequence of events that can be encountered in single-engine F-14 operations around the carrier. It has provided my squadron with an abundance of NATOPS training material. Recent mishaps from these types of emergencies in the last few years in the F-14 community have demonstrated the need for each Tomcat aircrew to know these aircraft systems inside and out. Our squadron NATOPS officer has become our resident expert on the F-14 fuel system, and has developed an in-depth training program on that aircraft system as well as on single-engine operation. My compliments to Miles and Approach for providing the fleet with not only an enjoyable but also highly educational article.

Lcdr. J.R. Barnett
VF-21/Safety

**• ARE YOU A PART OF NAVAL AVIATION HISTORY? If so, you should share it with the rest of America. The Association of Naval Aviation is contributing to the production of a 60 minute television documentary commemorating the 75th anniversary of naval aviation to air on public television in May, 1986. Pilots, aircrew, strategists, historians, designers or anyone with a story to tell are invited to contribute. They need movie footage, still photos and "sea stories" from 1911 to 1985.**
**Contact: Joanna Allen**
**Varied Directions**
**63 Elm St.**
**Camden, ME 04843**

Approach welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: Approach Editor, Naval Safety Center, NAS Norfolk, Va. 23511-5796. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.



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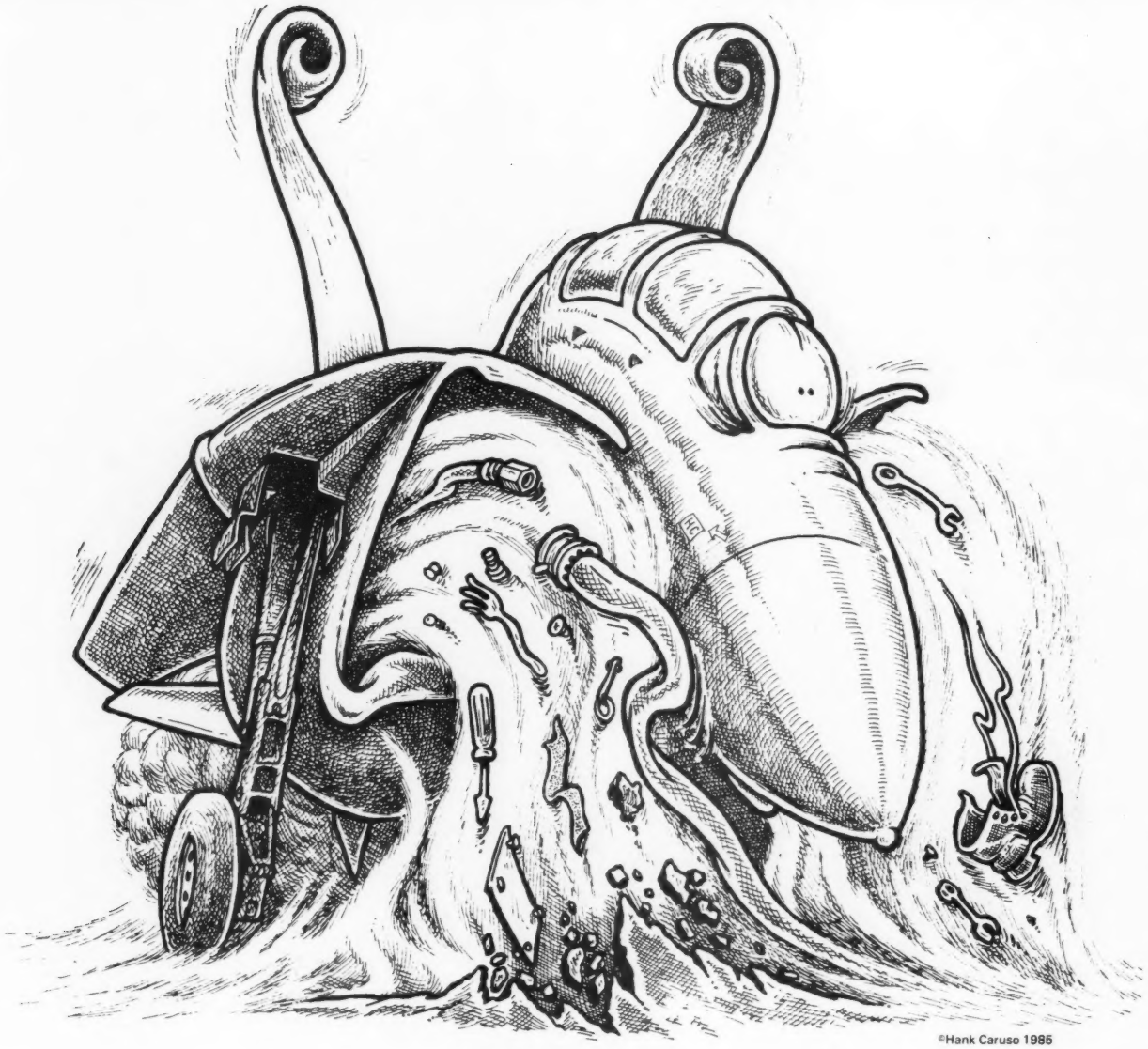


**Tomcat** n. inhabitant of CV environment, known for its voracious, uncompromising appetite. Eats: aardvarks, bats, cats, dogs, eagles (F-15 type), and — FOD. (Especially FOD!) Please! Don't feed the Tomcat!


# DON'T GET BURNED.
# THINK ABOUT YOUR EGRESS.

Poster idea contributed by Capt. Dave Winston, USMC, HMH-464